

THE IRON AGE

New York, Thursday, September 27, 1906.

The Norton Car Wheel Grinder.

The car wheel grinder shown in the illustrations is one of two machines which have been built by the Norton Grinding Company, Worcester, Mass., for one of the large American railroads. Its purpose is to grind chilled car wheels more accurately round and concentric than has previously been possible in practice, where, it is stated, that up to the present time variations from exact work have amounted from 1-64 to $\frac{1}{8}$ in., according to various opinions. The railroad company for which these machines were built purposes to grind ordinary car wheels to a degree of accuracy which will equal the finest machine work, and it is probable that these machines will

order that as much rigidity as possible may be obtained and that no account need be taken of center holes that may be out of position by long use, as it is intended to grind car wheels with flat spots in which the journals may be more or less worn eccentric with the center holes, and the grinding of the wheels may be done in many cases without returning or regrinding the journals.

The journals rest on a half round bearing at either end, shown in detail in Fig. 4. The bearing is of lumen bronze and is hemispherical on its external surface, which rests in a corresponding pocket. The nether part of the hemispherical surface of the bearing contains a slot which is entered by a pin in the pocket. The object of this specially formed bearing is to allow it to

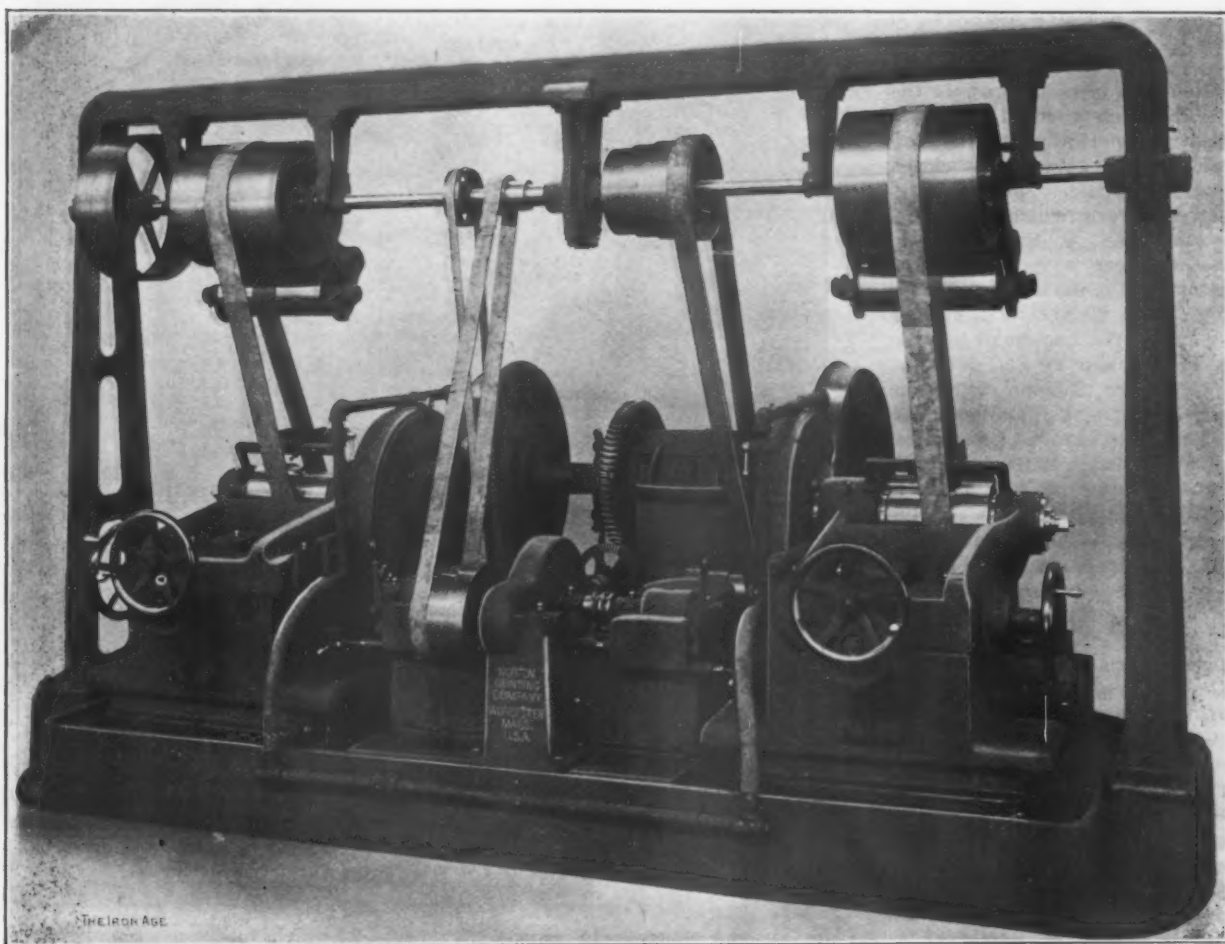


Fig. 1.—Front View of the New Car Wheel Grinder Built by the Norton Grinding Company, Worcester, Mass.

commercially grind car wheels that will not have an error from roundness and concentricity of over 0.002 or 0.003 in. The belief is that railroad trains equipped with such wheels will show a marked improvement in the way of steady and quiet running, and that the lives of the rails and roadbeds will be prolonged, and that there will be less wear on the running gear of trains.

The car wheel grinder is built with the same care for accuracy and durability that characterizes the regular types of Norton grinding machines, the main thing being to have the machine perfectly rigid, to prevent variation between the axes of the car wheel and the grinding wheel during the operation of grinding.

The car wheel with its axle is driven from the center by a worm and worm wheel, as seen in Fig. 1, an opening being left in the revolving journal of the worm wheel and a segment of the worm wheel being removable to admit the axle. The car wheel revolves on its own journals, in

adjust itself to a wheel journal that has become worn until it is somewhat tapering. A portion of the bearing surface is cut away at the bottom, permitting the car wheel journal to rest on the two sides, which are comparatively small segments of the complete bearing circle. By this arrangement a variation from standard size of journals, due to wear, is compensated for, the bearing in such a case acting practically as a V. The cut-away portion of the bearing is filled with felt saturated with oil. The journal pressing its way into the felt is oiled automatically as it revolves. A special bearing is provided for each standard size of journal.

The uprights for supporting the car axles are movable parallel to the axis of their centers, to permit the grinding of wheels that have their journals inside of the wheels as well as those that have them outside, as in the more common practice followed with standard railroad wheels and axles.

The grinding wheels are mounted on wheel slides similar to those of the regular type of Norton grinder. The wheel slide is in turn mounted on another slide which has a movement parallel to the face of the car wheel, and this is mounted on a slide base which rests upon the base of the machine. The slide base is pivoted and enables the operator to arrange the traverse of the grinding wheel for a number of different angles of car wheel faces. The slide operating parallel with the car wheel face is immersed in oil, in order that there may be no possibility of roughing up or sticking, due to the fact that the slide travels exceedingly slow and has a very short movement. This precaution also removes the necessity of care on the part of the operator, for once filled with oil it will perform its function for a very long time, probably for years. The slides working parallel to the face of the car wheel are arranged for automatic traverse, and also for the operator to move them short distances by the hand wheel.

On either side of the driving gear, at the center of the machines, is a clutch shown at *a*, Fig. 3, and one of them is also shown in Fig. 1. The vertical handle *c* is used to throw in the clutch, which is locked in engagement automatically by a mechanism inclosed between the clutch and the handle. The clutch revolves a worm which actuates a worm wheel, *b*, Fig. 3. The worm wheel is mounted on a crankshaft, *c*, the crank *d* moving the slide a distance of 2 in. The raising of the two small handles *e*, Fig. 3, and in Fig. 1 at the front of the machine, will cause the slide to stop automatically when in its extreme position toward the flange of the car wheel, but in no other position, and it is consequently impossible for the operator to stop the traverse at any other position of the stroke, which prevents any misunderstanding on his part of the relation of the grinding wheel to the flange when he is adjusting the hand wheels. If the operator adjusts the position of the slide so that there is proper contact of the grinding wheel with the flange before throwing in the clutch for the traverse of the slide it is evident that, inasmuch as the slide is stopped automatically at its extreme position toward the flange, there can be no danger of too great a cut against the flange when the clutch is engaged. The clutch is automatically tripped at the extreme end of the stroke by the little slide stop *f*, Fig. 3, which disengages the clutch. The clutch must be thrown in again by the operator by raising the handle *c*.

The stopping and starting of the revolving of the work is accomplished by a lever between the two car wheels, shown in the front elevation, Fig. 3. It is so arranged that the operator can stop the revolving of the worm and worm gear at exactly the right position for placing in the car axle.

Water is supplied to the wheels by a pump having a capacity of 80 gal. per min., 40 gal. on each wheel. The base of the machine is so constructed that all water is conducted to the settling tank, no matter where it may have been thrown accidentally or otherwise. A large water tank is provided in the foundation under the machine, from which the pump draws its supply. The grindings from the wheels flow with the water into a large settling tank, which may be removed from time to time by an overhead crane and carried to a convenient place where the sediment may be disposed of.

The grinding wheels are 24 in. in diameter by $2\frac{3}{4}$ in. face. The weight of the wheel spindles and wheel slides on which the grinding wheels are mounted is 1500 lb. The machine is arranged with self-contained overhead works, permitting the passing of a crane overhead and the lifting of car wheels in and out of the bearings upon which they revolve. The machine can be driven by electric motor with a belt from a line shaft, or by a motor placed on the floor near the end of the machine, in the depression shown in the front of the end view, Fig. 2.

The worms driving the worm wheels are immersed in oil, and where necessary, everything is covered with heavy guards to prevent breaking or interference. The screws moving the slides, as well as the nuts in which they run, are massive, and every precaution has been taken to produce a machine that will stand heavy, rough usage and at the same time produce very accurate work

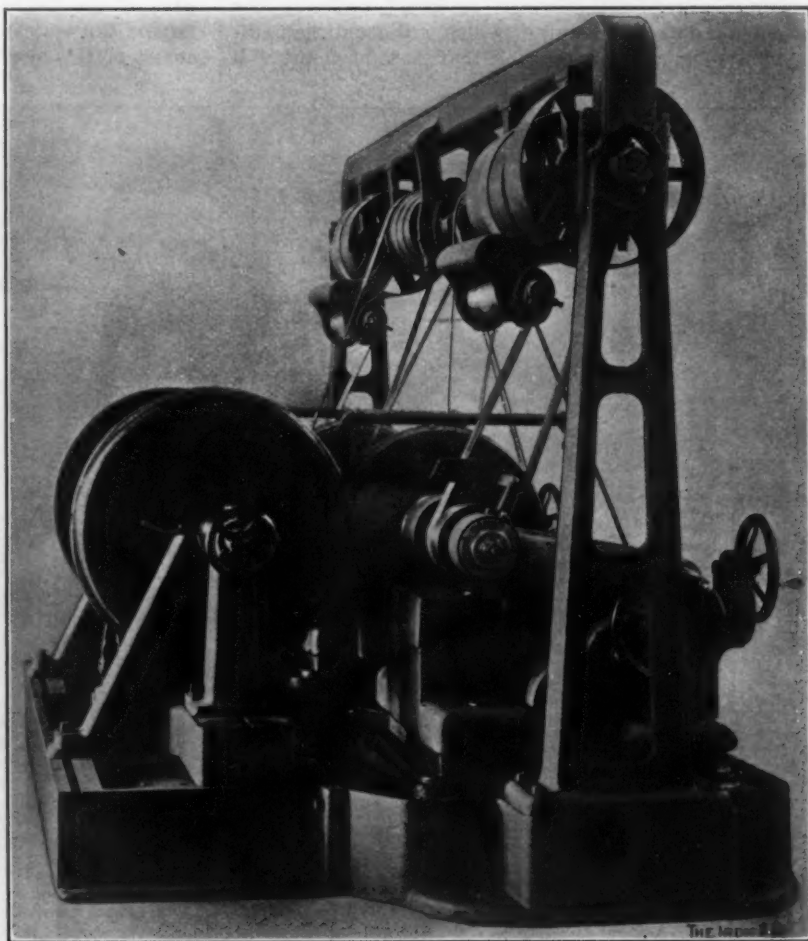


Fig. 2.—End View of the New Norton Car Wheel Grinder.

in commercial time. The weight of the machine is 30,800 lb. The machine is furnished belted throughout. It is desirable that a 30-hp. constant speed motor be used for driving the machine.

The Connally-McIlheran Electrical Engineering Company.

The Connally-McIlheran Electrical Engineering Company, Chattanooga, Tenn., has been incorporated with a capital stock of \$10,000. The engineers identified with this company consist of the following: W. B. Connally, formerly electrical engineer of the Wellman-Seaver-Morgan Company, Cleveland, Ohio; W. C. McIlheran, formerly electrical engineer for the Decatur Car Wheel & Mfg. Company, Birmingham, Ala., also recently with the Tennessee Coal, Iron & Railroad Company; W. C. McAfee, electrical engineer for the Atlanta Steel Hoop Company, Atlanta, Ga.; H. A. Clark, electrical engineer for the United States Cast Iron Pipe & Foundry Company, Chattanooga, Tenn., also formerly electrical expert for the Gregory Electric Company, Chicago. The two

last named will not be actively identified with the company for the present.

This company will engage in consulting and constructing engineering, sell electrical machinery and supplies and do repair work. It expects to extend its operations over the greater portion of the South. The company is the first to move into the new Pound Block, corner Eleventh and Market streets, Chattanooga.

Electrical Equipment for the Hudson Companies' Tunnels.

The twin tunnels of the Hudson Companies connecting Jersey City with New York under the North River represent the most recent development in electrical projects centering about New York City. Construction work on these tunnels was finished about a year ago and work on the electrification will begin at once. The General Electric Company will furnish the complete electrical equipment. Fifty electric cars will be operated, taking their power from a third rail.

Each tunnel will have a single track, the north tube

taining five 1500-kw. rotary converters and fifteen step-down transformers; substation No. 2, at Washington and First streets, Jersey City, containing four 1500-kw. rotary converters and twelve step-down transformers, and sub-station No. 3, at Cortlandt and Church streets, New York City, containing two 1500-kw. rotary converters and six step-down transformers. Each substation will in addition contain one spare 1500-kw. transformer. It is expected that when the new line is in operation the running time between the various subur-



Fig 4.—Detail of the Bearing in Which the Car Wheel Axles Rest During the Grinding.

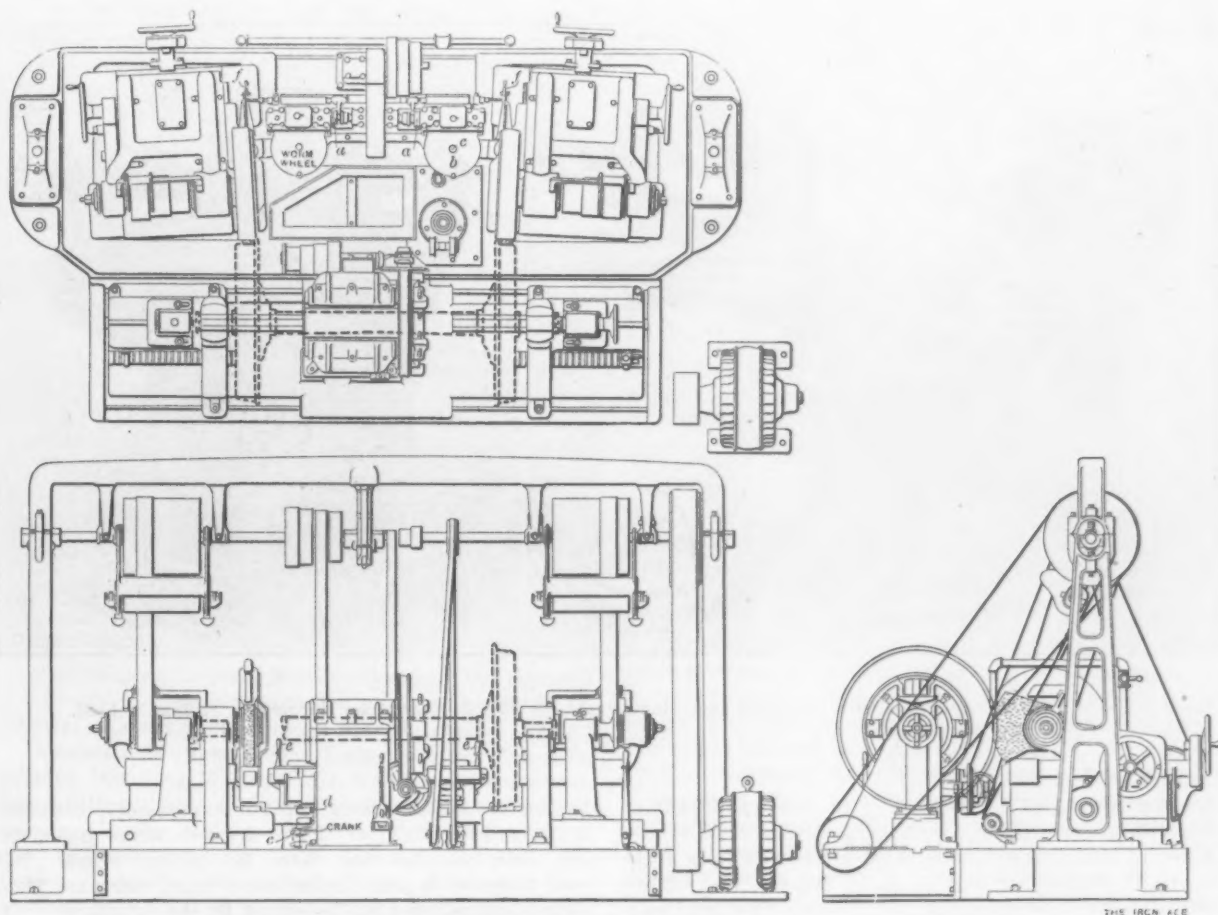


Fig. 3.—Plan, Front Elevation and End Elevation of the Norton Car Wheel Grinder.

carrying the west bound traffic and the south tube carrying the east bound, or toward New York traffic. The cars will be operated in trains by the Sprague-General Electric system of multiple unit control in a manner similar to that employed on the New York Subway trains. Each car will be equipped with two General Electric 76 (160-hp.) motors. Power for this new development will be supplied from a large station on the New Jersey side, located between Jersey City and Newark. Curtis steam turbines will be employed, initial equipments including two 3000-kw. 11,000 volt machines and two 6000-kw. 11,000 volt machines.

The total power generated will be distributed at high voltage to three substations, where the alternating current will be stepped down to 650 volts direct current through transformers and rotary converters. These substations will be located as follows: Substation No. 1, at Greenwich and Christopher streets, New York, con-

ban cities of New Jersey and New York City will be reduced one-half.

The Seneca Chain Company, Kent, Ohio, has purchased the plant of the American Chain Company, Zanesville, which it will operate in connection with its other plant, putting 40 fires in operation at once. The plant is located on the Baltimore & Ohio, Pennsylvania and Wheeling & Lake Erie railroads and will give the company 227 fires in actual daily operation. The continued growth of the business necessitated this increase in capacity.

Experiments have been made at the Schenectady works of the General Electric Company with melting brass in the Colby electric induction furnace, which has been introduced for steel working at the Disston works, Philadelphia.

A New Gorton Disk Grinder.

A machine claimed to cover the widest range of work yet attained by one of its class is the No. 6K Gorton double header disk grinder, built by the Diamond Machine Company, Providence, R. I., and illustrated herewith. It is designed to grind parallel sides of work at one setting, and the right hand head is arranged to swivel, so that sides at a slight angle can also be ground at one setting. A special feature of the machine is the sliding bearing on the right hand head, which entirely protects the spindle from emery dust. Another feature is that the table is set on a rocker so it can be worked back and forth between the disks. The right hand head can be moved back, as in Fig. 1, or removed altogether and the machine may be used with the rigid head as a single disk grinder. A table can be then set and clamped in any position.

Fig. 2 shows the machine as it is ordinarily intended to be used. The arbors are $1\frac{3}{4}$ in. in diameter. The arbor on the right hand has endwise movement of 1 in., controlled by a hand lever and provided with a microme-

claimed to be commercially impossible by any other method. It can be operated by unskilled workmen, and in many cases turns out 10 times the amount of work otherwise attempted. Gauges, studs or jigs can be fastened on the tables for holding irregular shaped pieces. The table can be set quickly at any desired angle by means of large graduating scales.

The company is at present bringing out a new machine of the same general type known as the No. 6 K-4, which resembles this one in every respect except that it has two pairs of disks.

The Pennsylvania Swedish Iron Company.

The steadily increasing demand for charcoal iron blooms has induced the Pennsylvania Swedish Iron Company, Cheswick, Pa., to augment its capacity by adding two more knobbling fires. This will enable the company to take care of present business, while its forge is so constructed that more fires may be added, two or more at a time, to meet future requirements. The blast is supplied

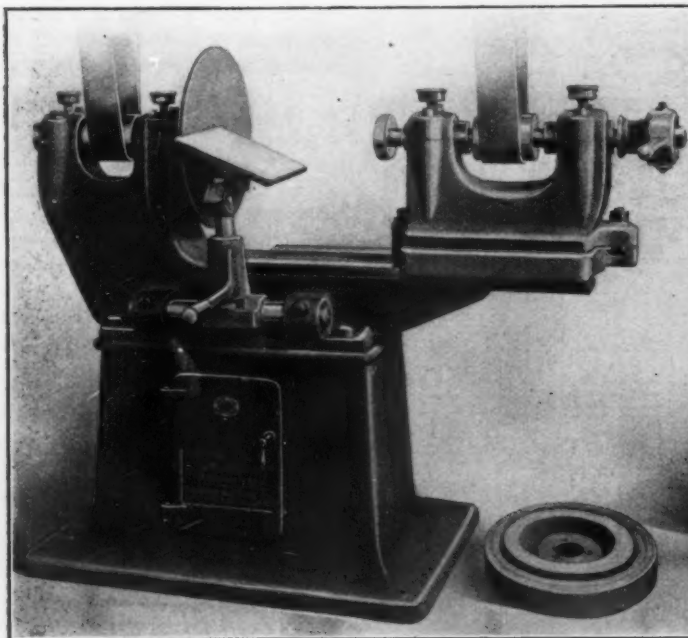


Fig. 1.—The No. 6K Gorton Disk Grinder Arranged as a Single Disk Machine.

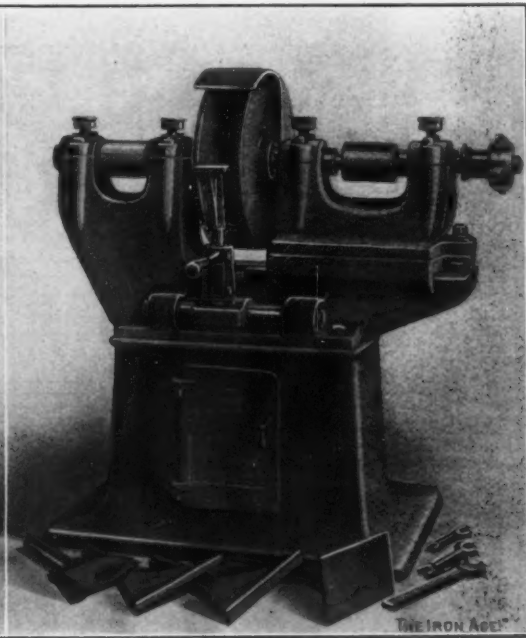


Fig. 2.—The Same Machine as Ordinarily Used.

ter stop reading to thousandths of an inch, which enables work to be readily duplicated within very close limits. The right hand head is graduated to swivel to any angle up to 15 degrees or will go to 90 degrees, and allows slight angles to be ground at one setting. This head may be adjusted to receive work up to 12 in. In cases where a large quantity of stock is to be removed steel chucks for emery rings may be substituted in place of steel disks.

With each machine are furnished four 18-in. steel disks, six disk bolts and nuts, 12 assorted abrasive Adamite circles, one cementing press, the necessary wrenches, four work tables, one adjustable table, one circular work holder and a countershaft intended to run at a speed of 500 rev. per min. At this speed the spindles run at 1800 rev. per min. The net weight of the machine with its accessories is 2000 lb.

The diameter of the chucks where emery rings are used in place of heads is 12 in. The disks and chucks are interchangeable on all of the company's regular machines. Plain or grooved steel disks are furnished on special order. With the circular work holder the machine is able to grind thin circular pieces on both sides at once. All tables have a wide range of adjustment and hand rocking lever.

The double disk grinder is capable of accurately finishing small parts of machinery at very rapid rates,

by duplex Ingersoll-Sergeant air compressors, sufficient in volume for 16 fires. There are two steam hammers, one 5000 lb. and one 6000 lb. falling weight. All raw material is kept under cover when unloaded from convenient railroad tracks owned by the company.

The forge is situated on the Cheswick & Harmer Railroad, with connection to the Pennsylvania Railroad, West Penn Division. The skilled employees are Swedes and are rapidly establishing their homes near the plant. The company has entered orders that will keep it busy for many months, and indications are that it will become an important factor in the revival of this well tried process of making iron. It would be a revelation to old iron workers to see the application of modern ideas to this peculiar method of iron manufacture. The blooms made range in size from 4 x 4 to 8 x 8 in., once hammered or reheated and rehammered, ready for rolling directly into staybolt and rivet iron or into sheets and tin bars. A large portion of the product is used for making charcoal iron skelp for marine and locomotive boiler tubes. In this line the company has met with exceptional success. Under recent reorganization A. M. Bell, Pittsburgh, becomes president; Ambrose Beard, resident general manager and vice-president, and Richmond M. Graff, Pittsburgh, secretary and treasurer. All business is transacted at the general office at Cheswick, Pa.

Mexican Railroad and Business Notes.

Excessive Rains.

DURANGO, September 19, 1906.—Rains have been overabundant the past two or three months. Much damage has been caused to growing crops by the flooding of fields in various districts. Great loss of property has also resulted from inundations, and in some instances lives have been lost. Several hundred people have been rendered homeless in the city of Durango by the collapse of adobe dwellings, while blocks in several sections have been made untenable by the undermining of foundations. The city of Zacatecas has also suffered severely. Traffic has been interrupted on the railroads, and construction work entirely suspended on new lines. Present reports indicate a shortage in the corn crop. Favorable advices come from the State of Chihuahua relative to the prospective yield of the cereals, but other States send out discouraging reports.

Railroad Construction and Concessions.

It is expected that the Mexican Central Railway Company will let the contract during the present month for the first 50 km. of its short line between the capital and Tampico.

A concession has been obtained by S. Pearson & Sons, Limited, for the construction of a short line from Minatitlan to the Tehuantepec National, the road being intended as an outlet for the product of the petroleum wells which the company has been developing for some time.

A rather ambitious project is being promoted in the State of Sonora by capitalists from Arizona and California in the shape of a line some 500 miles long between a division point called Carbo, on the Sonora Railroad, to the town of Copeta, and thence to the Yaqui River. A concession has not yet been obtained.

In connection with the further development of the copper properties near the town of Tezuitlan, in Puebla, Mexican and United States capitalists have secured a concession to construct a line of railroad from the pueblo named to the seaport of Nautla, in the state of Vera Cruz. The Tezuitlan Copper Mining Company is the principal company operating in the district.

A. S. Mackensie has been given a concession for a line of railroad to be constructed from Carbo, in the State of Sonora, to the mining district of Copeta. Five years are allowed for the construction at the rate of 10 km. a year. The line is to be of standard gauge.

The Mexican National Railway Company has obtained concessions for several branches of short length to industrial establishments situated near the capital.

Amendments have been made to the concession granted last year to Eugenio J. Cañas, of Cuernavaca, for a railroad from Zacatepec to Jojutla or to Tlalquiltenango, in the State of Morelos. According to these the concessionaire may build from Zacatepec to the towns of Jojutla and Tlalquiltenango, with side lines leading to the largest sugar plantations in that region. At least 8 km. of road must be finished within one year from May, 1906, and the whole line within three years.

Industrial Notes.

In the fiscal year 1905-06 imports of merchandise into Mexico reached a total value of \$220,651,074.49, compared with \$178,204,962.45 in the fiscal year preceding, being an increase of more than 23 per cent. Included in the total for the year just closed were the following: Machinery, apparatus, &c., \$20,539,212.70; vehicles, \$4,620,031.53; arms and explosives, \$4,122,237.03. Exports in the same year were valued at \$271,138,809.32.

The Bank of Jalisco, in the city of Guadalajara, has made a loan of \$1,000,000 to Manuel O. Gallado, the holder of a concession for an extensive system of irrigation to be carried out in the neighborhood of Lake Chapala by the utilization of the waters of the lake.

The Mexican Railway Company, which for some time has had under consideration the question of substituting crude oil for coal under locomotive boilers, has decided

to make the change, and has purchased an oil carrying steamer to transport the fuel from the supply source at Tampico to Vera Cruz.

The National Railway Company intends to increase greatly its terminal facilities in the City of Mexico and in Monterey.

A contract has been entered into by the Mexican Government with a London ship owning syndicate for the establishing of a line of monthly steamships between Canadian and Mexican Pacific ports. The boats will run between ports in British Columbia and Acapulco, Mazatlan, Salina Cruz, Guaymas, &c.

A large additional order for equipment has been placed in the United States by the Mexican Central Railway Company. It comprised the following: Barney & Smith Company, four combination baggage and express cars, and 11 regular express cars; Standard Steel Car Company, 750 steel frame box cars, 150 steel stock cars, 100 steel flat cars, and 180 steel tank cars.

The company operating the street car system in Guadalajara, known as La Electra, has given an order for 40 cars, which goes to the McGuire-Cummings Mfg. Company, Chicago. The United States Steel Products Export Company will supply 1800 iron trolley poles and \$200,000 worth of copper wire. The dynamos, switchboards and other electrical equipment required will be purchased from the General Electric Company.

R. M. Wiggins, representing in Mexico the National Malleable Castings Company, Cleveland, Ohio, has recently returned from a visit to the United States, where he made arrangements to act as representative in the republic for other firms, domiciled in New York and Europe.

The Mexican Steel Products & Machinery Company, S. A., was incorporated August 29, with a paid up capital of \$100,000, with offices at 3a Independencia No. 1, City of Mexico. The founders are Charles S. Johnson, Phillip G. Roeder, George K. Tinker, and B. W. Willson.

It is announced from Guadalajara that capitalists of New York are in negotiation with the owner of the iron foundry known as La Ferreria de Tula, and the adjacent iron ore mines, as well as an extensive body of timber land, with a view to their purchase. An option upon the entire property is said to have been secured by W. A. Rogers, of the Jalisco capital city and J. P. Taylor of the City of Mexico, in the interest of the prospective investors.

An attorney representing Julius Buss has applied to the Government for a concession for the establishment of a modern plant for the reduction of zinc ores, to be erected either in the State of Nuevo Leon or Coahuila.

The Mexican Car & Foundry Company, whose shops are at Hutchison, near the capital, is turning out a large number of cars for local railroads.

The Monterey Nail Works Company has obtained a concession from the state government of Nuevo Leon to manufacture its own wire and will build mills for that purpose. The Spanish style of the concern is La Compania de la Fabrica de Clavos de Monterey, S. A.

A Mexican daily of the capital makes the following statement, which will be of interest to makers of agricultural implements:

"It is reported that the Government, with a view to the encouragement of agriculture along modern lines, has decided on substantial reductions in import duties on agricultural implements and machinery. If such reductions are made, they will result in great benefit to American manufacturers. At the present time Mexico buys practically all its agricultural machinery from the United States."

The Tiriscobuasa Irrigation Company has applied for a concession to use the waters of the River Mayo in the State of Sonora.

A similar concession has been applied for by Manuel R. Collada, who wishes to generate motive power, for which purpose he would use the waters of the River Atoyac, in the State of Puebla. J. J. D.

The Atlanta Tin Plate & Sheet Mill's annual capacity is 14,000 tons of sheets, not 1400 tons, as stated on page 726 in our last issue.

The American Boiler Manufacturers' Association.

Eighteenth Annual Convention, Pittsburgh, Pa.

In last week's issue the proceedings of the eighteenth annual convention of the American Boiler Manufacturers' Association at Pittsburgh were reported up to a portion of the session of Wednesday morning, the 19th inst.

After the presentation of the report of the Committee on Uniform Boiler Specifications, an informal address was made by George Uhler, Inspector General of the Steamboat Inspection Service, his remarks evidencing that he took a very strong and intelligent interest in the work of the committee. The committee had all along felt that the co-operation of the Board of Supervising Inspectors was necessary to the ultimate success of its labors, and while it has had such co-operation in the past there have been naturally frequent differences of opinion in regard to methods, although the aim of both the bureau and the A. B. M. A. has been essentially the same—namely, the improvement of steam boiler practice in the United States. This improvement has been sought for by the association because naturally State laws and city ordinances governing the construction of boilers for stationary purposes follow along lines laid down by the Federal authorities, and thus uniformity and excellence in boiler practice depend in a large measure on such Federal regulations.

While the A. B. M. A. in the past has had as its guest, and to take part in its discussions, local members of the Board of Supervising Inspectors, as well as local boiler inspectors, on no previous occasion has the head of the service taken such a direct practical part in the discussion, and General Uhler's attitude of continued interest and co-operation in the work of the A. B. M. A. is looked upon as certain to bear fruit. That this is fully recognized was shown by the unanimous adoption after his address of a resolution of thanks to the secretary of the Bureau of Commerce and Labor and to Supervising Inspector General Uhler.

Supervising Inspector General Uhler's Address.

General Uhler, in his remarks, very clearly explained the difficulties under which the board acts in its task of interpreting and applying the steamboat inspection law, many sections of which have, by reason of the vast increase in the steam tonnage of the country, and the improvements made in engines, boilers and the materials of which they are constructed, become obsolete and in many cases even worse than that, tending to intensify the very evils which they were originally designed to correct.

A single instance of several given in his remarks shows this very clearly. The steamboat law was in the beginning mainly based on conditions existing on our Western rivers. In order to have the pump for fire service ready at hand for the engineer, the law prescribes that no pump for fire service shall be placed below the lower deck of a vessel. On a Mississippi River steamboat this means the same deck on which the engines are located, so that the engineer need only turn around or take a few steps to reach the fire pump on which depends the safety of the vessel in the event of a conflagration; but the lower deck on a steamship, as understood in the lake and salt water service, is several galleries or platforms above the post of the engineer; yet, by the distinct provision of the law, the fire pump has to be placed in this position that would be known as the lower deck of a vessel, and the object sought by the law, that is to have the fire pump ready at hand for instant use by the engineer, is thus rendered nugatory. It took several years of active discussion by steamship owners, with the full co-operation of the Board of Supervising Inspectors, to have this language modified so that the safety sought might be insured.

General Uhler stated in strong language that the main duty of the Board of Supervising Inspectors was to render our steamboat and steamship service the best and safest in the world, expressing in fact the idea on

which the A. B. M. A. was founded, as shown by the preliminary discussion of that association at its first meeting in Pittsburgh in 1889.

What was of the greatest interest to the assembled boiler manufacturers was the fact that General Uhler's remarks indicated a definite policy and a most commendable one on the part of the administration. In giving expression to this he said that it was not only the understanding but the desire of the secretary of the Department of Commerce and Labor that all interests should be and could be represented before him or the proper bureau officer at any time, and that it is the purpose as well as the policy of the Department to advance the progress of all industrial enterprises and institutions rather than to retard by any technical requirements or regulations the convenience or business interests of the community. General Uhler set forth clearly what is required and what might be expected.

He explained that section 4433 of the present law works a disadvantage to manufacturers generally in that they are prohibited from constructing a boiler that would be for all intents and purposes a better boiler than might be constructed under the present law, and he suggested that the efforts of the association should be rather directed toward the repeal of this law than to discussing its obvious disadvantages in practice. The speaker further enlarged upon the possibilities of material—steel particularly—and urged that good steel can be manufactured under present specifications, a statement which he fortified by presenting samples of materials that were remarkable both from their tensile strength and their ductility. The speaker believed that our material is superior and our design and construction are equal, if not superior, to any of foreign origin or production, and said that the present steamboat inspection law, although in some particulars imperfect, is equal to the inspection laws of any nation upon the face of the earth.

In Memory of Samuel Borger.

Obituary resolutions were adopted upon the death of Samuel Borger of Columbus, Ohio, as reported by the committee, Messrs. E. D. Meier, D. Connelly and H. D. MacKinnon.

Vanadium as an Alloy for Steel.

At the afternoon session on Wednesday, B. E. D. Stafford, general manager of the Flannery Bolt Company, Pittsburgh, and also connected with the American Vanadium Company, Pittsburgh, read a paper on vanadium steel, in which he recounted the progress made abroad in the use of vanadium as an alloy for steel. One of his most striking statements is as follows:

"For your information I will state that in plain carbon manganese steel, with an addition of 0.25 per cent. of vanadium, the tensile strength was raised 65 per cent. and the elastic limit 68 per cent., without in any way impairing the structure to withstand the regular physical tests. With the same carbon manganese steel with 3.34 per cent. of nickel added, showing a tensile strength of 94,528 pounds per square inch and elastic limit of 73,024 pounds per square inch, by the addition of 0.25 per cent. of vanadium the tensile strength was increased 61 per cent., which was equivalent to 152,678 pounds per square inch, and the elastic limit was raised to 64 per cent., or equivalent to 112,539 pounds per square inch, and gave an elongation in 2 in. of 26 per cent. and a contraction of area of 52 per cent."

Specimens of vanadium steel were exhibited by Mr. Stafford which had tested 148,500 lb. tensile strength, 141,000 lb. elastic limit, 13.7 per cent. elongation and 24.7 per cent. reduction of area. No samples of boiler plate steel were among the samples shown. In answer to a question by W. L. Hirsch of the American Steel & Wire Company, Mr. Stafford stated that one of the samples shown would closely approximate the specifications for

regular boiler plate and that by the use of 0.25 per cent. of vanadium there had been obtained steel testing 81,250 lb. tensile strength, 58,200 lb. elastic limit, 23.6 per cent. elongation and 26 per cent. reduction of area. A discussion followed in which Mr. Hirsch stated that it seemed to him that the proportion of elongation in the sample presented was such that it would not recommend it for boiler steel. It might give a high tensile strength, but this could be attained in a cheaper way. What are wanted are elongation, elasticity and reduction of area, coupled with high tensile strength. The higher the tensile strength is increased the more the elongation and reduction of area are reduced. Mr. Hammond asked Mr. Hirsch whether he could make steel of that same tensile strength and elastic limit with carbon. Mr. Hirsch replied that steel of 65,000 or 70,000 lb. tensile strength could be made which would reach perhaps 26 per cent. or 28 per cent. elongation, the elastic limit of steel as a rule being about two-thirds of the tensile strength.

General Uhler stated that as he understood it from the samples and results of tests exhibited, and as explained by Mr. Stafford, the use of vanadium seems to sacrifice ductility for elastic limit and tensile strength. He understood that Mr. Stafford did not claim to be a steel maker, and if so, perhaps the availability of vanadium could better be left to the steel maker, in which Mr. Stafford agreed, but held that the specimens presented showed most remarkable results.

President Munroe suggested that Mr. Stafford bring in tests of plate steel and also a chemical analysis of the material. What the boiler manufacturer wants to know is whether it will crystallize after being placed in a boiler.

Mr. Stafford admitted that the steel makers are the ones to pass upon the question, and he believed they would be interested in making experiments. He would be pleased to present samples of boiler steel at the next convention. His company has discovered a large deposit of sulphide ore containing a high percentage of vanadium, the market value of which now is about \$2.50 per pound, but he believed that price would be practically cut in half.

At the suggestion of the chair, further consideration of this topic was referred to the Committee on Uniform Boiler Specifications, and a vote of thanks was returned to Mr. Stafford for his paper and exhibit.

Atlanta Gets the Next Convention.

A majority of the Committee on Time and Place reported in favor of the selection of Atlanta, Ga., as the convention city for 1907. The report was approved.

Election of Officers.

The following officers were elected to serve for the ensuing year:

President, M. F. Cole, Newnan, Ga.; secretary, J. D. Farasey, Cleveland, Ohio; treasurer, Joseph F. Wangler, St. Louis, Mo.; first vice-president, John J. Main, Toronto, Canada; second vice-president, J. Don Smith, Charleston, S. C.; third vice-president, William H. Fletcher, Hoboken, N. J.; fourth vice-president, H. D. MacKinnon, Bay City, Mich.; fifth vice-president, H. Goldner, Philadelphia, Pa.

On motion of Secretary Farasey, a resolution of thanks was unanimously adopted to all those who had participated in making the occasion so pleasurable and enjoyable, and to the technical and local press for reports of the meetings.

The only new member admitted during the convention was J. F. Thrash of the Dallas Boiler Works, Dallas, Texas.

An active campaign will be conducted the coming year for an increase in membership, the members fully recognizing the benefits derived in the past from the agitation of various questions affecting their interests, and the further successful prosecution of the good work already begun.

An executive session was held the latter part of Wednesday afternoon and Wednesday evening, adjourning at a late hour.

On Thursday morning a short session was held, the balance of the day being devoted to entertainment.

Past President Hartley Describes the Strongest Boilers Ever Built in This Country.

At the business session a paper was read by Past President H. J. Hartley of the William Cramp & Sons Ship & Engine Building Company, Philadelphia, describing some boilers recently constructed by that company under his supervision, notable in character in regard to the strength of materials entering into their construction, being the heaviest and highest pressure Scotch marine boilers ever constructed in this country.

They are designed to carry a constant working pressure of 234 lb. for the purpose of supplying steam for two 7500-hp. triple expansion engines for propelling two 7000-ton ships now in the course of construction by the William Cramp Company for the Southern Pacific Steamship Company, to be used in its passenger and freight traffic between New York and New Orleans. Each of these ships contains four single-ended and three double-ended boilers; the single-ended type being 15 ft. 4 in. in diameter by 11 ft. long, each containing four Fox corrugated furnaces, 3 ft. 5½ in. in diameter by 8 ft. 8 in. long, 11-16 in. thick, each having a separate combustion chamber. The double-ended type is of the same diameter, but 21 ft. 4 in. long, each containing eight furnaces of the same size and type, with separate combustion chambers also. The aggregate grate surface contained in the boilers for each ship is 770 sq. ft., and the heating surface 26,464 sq. ft., making the ratio of heating surface 34.1-3 sq. ft. to 1 of grate surface.

The shells of both the single and double-ended boilers are composed of plate steel 11-16 in. thick, double butt strapped and riveted with 1½ in. diameter rivets throughout, each rivet weighing from 2¾ to 4¼ lb. The sizes of the plates in each length of boiler vary from 5 ft. 9 in. x 24 ft. 7 in., to 7 ft. 8 in. x 24 ft. 1 in., and in weight per plate from 9817 lb. to 13,000 lb., respectively. The fire tubes of the boilers consist of two kinds, viz.: Stay tubes, 2¾ in. in diameter, and ¾ in. thick, with ends enlarged and threaded for screwing into tapped holes through both front and rear tube plates, and the ordinary tubes of the same diameter and No. 8 B.w.g. thick, which are simply expanded into the tube plates and their ends beaded over in the usual manner.

The air for fuel combustion in the boilers is supplied by natural draught system produced through a double sill oval stack 12 ft. 6 in. x 15 ft. 6 in. diameters, 96 ft. in height above the grate bars. The weight of each single-ended boiler, without fittings, is 65¼ tons, and that of each double-ended boiler 119½ tons, making the total weight of boilers, exclusive of fittings, for each ship, equal to 620½ tons, and including all fittings such as cast iron bridge walls, grate bars, etc., exclusive of all smoke boxes and up takes, equal to 684 tons for each ship.

The boilers were constructed under Lloyd's rules, requiring a hydrostatic test equal in pressure to double that of the working steam pressure, or equal to 468 lb. per square inch. This, however, was not strictly adhered to, on account of the vessels not being immediately registered under Lloyd's rules, and the United States Government rules not requiring such a high percentage of hydrostatic test pressure by 50 per cent. A compromise equal to 361 lb. was substituted, under which test the boilers proved to be unusually and remarkably tight.

This showing is noteworthy when it is considered that a few years ago it was thought next to impossible to construct steam boilers of such diameters and thickness of material as described to carry such a working pressure as 234 lb. The demand for such high steam pressure for boilers has been brought about by the substitution of the modern compound and quadruple expansion engines for the old low pressure type, as formerly, and more especially used in the marine service, which usually required from 20 to 35 lb. steam pressure.

The success and practicability of the high duty engine have been made possible by the ability to procure and work into shape for steam generators a grade of boiler steel capable of withstanding, with safety, such high pressures as are now required for the modern engines so generally in use.

Mr. Hartley concluded his paper as follows:

A Tribute to the Association.

The bringing about of the possibility of having this high grade of boiler plate steel manufactured had its inception in this city of Pittsburgh 18 years ago by the formation of an association which had for one of its objects the consummation of a uniform specification, by which a higher grade of steel boiler plate should be made, even regardless of the cost if necessary, to produce an article which should be superior to that which was in use at that period. The association alluded to in this connection, aided by the co-operation of the steel manufacturers, I am happy to be able to say, has been eminently successful in its mission, and to-day it is known throughout the country as the American Boiler Manufacturers' Association of the United States and Canada.

But notwithstanding what has been accomplished in this respect, still greater skilled exertion, with its attending difficulties, is destined for the boiler manufacturer to grapple with in regard to constructing boilers capable of sustaining higher steam pressures than have ever yet been required for commercial motive power. This question is now uppermost in the minds of advanced engineers, with the view of economy in obtaining a higher efficiency from the steam engines within the least possible space . . . this being especially so when applied to ships, in order to save cargo capacity, as well as a minimum consumption of fuel, both of which mean materially increased earnings for the operators.

In this connection I would state that I was recently verbally informed by a noted superintending engineer of one of the steamship lines plying between New York and the South Atlantic ports that the future new ships to be built for his company's line would be equipped with engines requiring working pressure of steam approaching 300 lb. per square inch, even if the boilers had to be reduced in diameter to safely carry that pressure. It belongs to the future to prove if this prediction will be fulfilled. Beyond all doubt, however, it is a well-known fact that during the last 20 years there has been a wonderful advance in the direction of higher steam pressures as applied to every branch of motive power, and therefore it is difficult to conjecture, in view of these rapid strides, to what increase the limit of higher pressures will reach.

Discussion.

General Uhler, who was an attentive listener to the foregoing paper, expressed his pleasure and interest, knowing from his long acquaintance with Mr. Hartley that any contribution from him would be entertaining. While he had great confidence in the ability and capacity of Mr. Hartley, he had not expected, in attending the convention, to hear a paper from him recounting such enormous pressures. He understood that the ships in question were to use superheated steam. This would mean the practical elimination of composition material valves and fittings which disintegrate at temperatures ranging at about 400. It means that composition fittings on those ships have been eliminated. The speaker had no doubt that the time is not far distant when steel is going to supersede everything in the nature of conductive compositions for steam, which, with such high pressures, will naturally have to be superheated. The day of the old copper pipe is fast waning, and its prestige is now practically gone. Composition valves formerly thought to be the only things in the world to withstand the stress of high pressure, more particularly superheated steam, have given way practically to steel fittings, steel body valves, and all that. It is easy to prophesy that within a very few years we will see the softer metals discarded entirely and absolutely, and their place taken by the more ductile conditions of steel, as we hoped to meet them.

General Uhler inquired of Mr. Hartley whether in the expanding and beading of the tubes in this construction he had made any longer flange or left any longer piece for the bead, or if he just rolled the ordinary bead on the tube. Mr. Hartley replied that in this case they left a little more on the end. Owing to the use of pneumatic hammers, better sections are obtained in flanging ore without cracking than formerly, when the old keeling out style was in vogue with a hand hammer. The screwed tubes are merely expanded, having been screwed in without turning over, because they are 1½ in., and it is impossible to turn that metal over. George R. Bentley inquired if that was 60,000-lb. steel, and the speaker

replied that it was from 55,000 to 64,000. General Uhler remarked that it was about 61,720 as an average, and that he remembered the material very well.

Mr. Hartley stated that, owing to the thickness of this plate, in going through the roll, the scale would fly off 3 or 4 ft., and would come out just as clear as if it had been pickled, showing what movement there must have been between the outside and inside in going through the roll.

General Uhler recounted some interesting reminiscences going to show the immense progress made in the capacity, tonnage and equipment of seagoing vessels within the past quarter of a century, all of which, he thought, goes to emphasize the necessity for the highest grade of excellence in material, which has made this progress possible, and which will enable man to go forward and always upward in his efforts to utilize the powers of nature.

No further business offering the convention adjourned *sine die*.

Courtesies to Ladies.

Mention should be made of the various courtesies tendered the ladies, among them being the reception Tuesday morning, automobile rides through the parks, lunch at the Country Club on Wednesday, the visit to Luna Park Wednesday night, in which both ladies and gentlemen participated, Thursday being devoted to a trolley ride and visit to the preserving plant of the H. J. Heinz Company, where many courtesies were tendered by the management, and an elaborate luncheon was served, after which a demonstration was given of the lowering and raising of the bear trap at Herr's Island Dam, which is directly back of the Heinz main plant.

Exhibits.

For obvious reasons exhibits at these conventions have never been a feature. The Chicago Pneumatic Tool Company, however, never fails to be on hand with a handsome souvenir. This time it was a clock. It also kept open house in room 700 in the Hotel Schenley and had on exhibition and in operation a line of portable electric drills and reamers. The company was represented by W. O. Duntley, Chicago; Thos. Alcorn, New York; C. T. Smith, Cleveland, and H. S. Hunter, Pittsburgh. The progressiveness of this firm is shown in its exploitation of electricity, it being a much more economical power than compressed air, and many boiler works not being equipped with air. The Geo. R. Rich Mfg. Company, Buchanan, Mich., exhibited high speed flat drills and Rich patent drill chucks, and were represented by Russell Dale, Chicago, and W. F. Heacock, Philadelphia. Exhibits were also made by the Cleveland Pneumatic Tool Company and the Bury Compressor Company.

The Banquet.

The final entertainment was the annual banquet Thursday night, which, if possible, eclipsed any of the prior events of this character in the history of the association and reflected great credit on the indefatigable committee having it in charge. The menu card was embellished with half-tones of old Fort Duquesne and Pittsburgh in 1813, contrasted with views of the Pittsburgh of to-day. Col. E. D. Meier acted as toastmaster, and the speakers and toasts were as follows: Hon. James Francis Burke, Member of Congress, "Our Nation's Progress"; Gen. George Uhler, Supervising Inspector General of Steam Vessels, Washington, D. C., "Our Marine Laws and the Boiler Manufacturers"; Walter M. McFarland, "The Ladies"; W. O. Duntley, "Our Greater West"; J. D. Farasey, "An Expression of Gratitude," and James Lappan, "Advancement in the Manufacture of Steam Boilers." An interesting event not down on the programme occurred when David J. Champion of Cleveland, on behalf of the organization, arose and presented to George N. Riley of the National Tube Company, Pittsburgh, a beautifully engraved solid silver loving cup in token of the fact that Mr. Riley was one of the first members of the association and of its associate body and has attended every one of its 18 conventions. Mr. Riley, although taken unawares, managed to express himself in graceful terms of appreciation.

A New Noiseless Gear.

The noiseless gear shown herewith in cross section is the invention of Frank E. Bocorselski, superintendent of the Baush Machine Tool Company, Springfield, Mass., who has applied for a patent on the device. It consists of a cast iron blank, with a sleeve upon which are fitted three rings, each of a different material—bronze, fiber and steel. These sections are held in place by a key and by three riveted pins, thus forming of the four materials a practically solid gear blank.

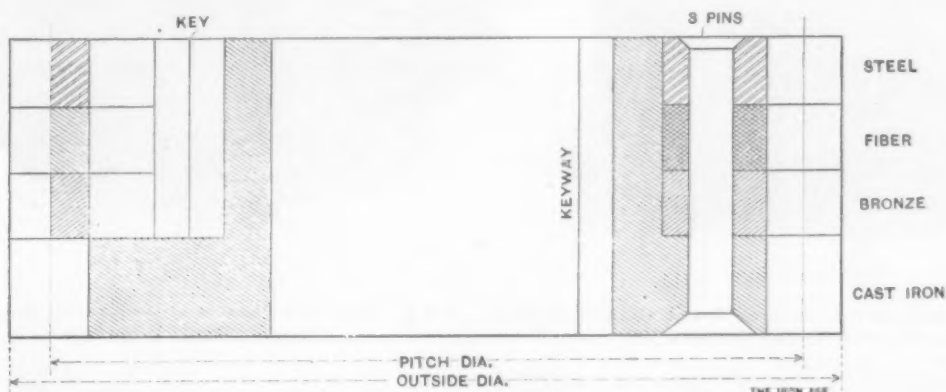
An exhaustive test of one of these gears has been made in a 42-in. Baush boring mill in mesh with a cast iron gear. The desired noiseless quality, commonly accomplished by rawhide and similar gears, was demonstrated, and also the wearing quality, which was the inventor's chief purpose. It was found that his theory worked out in practice; that the gear wore no faster than its quickest wearing member or metal. There was of course no getting out of shape, and consequently no need of recutting the teeth, which is necessary in some types of noiseless

Company, machinery dealer. The Garrett-Cromwell Engineering Company, Cleveland, Ohio, is engineer for the plant.

The New City of Gary.

The building of the town of Gary, Ind., where the plant of the Indiana Steel Company, a subsidiary company of the United States Steel Corporation, is to be located, is progressing with vigor. The construction of 297 dwellings, the contract for which was let to the Falkenau Construction Company, Chicago, is under way. These buildings, involving a total cost of \$900,000, are in a variety of designs, of brick and frame construction, and will be rented and sold to employees at figures ranging from \$3800 to \$13,000. They are scattered about at various points between Sixth and Eighth avenues and from Van Buren to Georgia streets.

The Gary Land Company has fixed prices on the lots, which it offers for sale as low as consistent with the cost to it of the land and the improvements. Each lot is sold



A New Noiseless Gear.

gears. Naturally the wear is longer than that of a solid steel gear. There is also, as the test proved, ample strength in the new gear.

The American Roll & Foundry Company.

The American Roll & Foundry Company, Canton, Ohio, has been incorporated with a capital stock of \$200,000. The company has organized by the election of the following officers: J. B. Baird, president; William Gardner, vice-president; Edward Langenbach, treasurer, and David B. Day, secretary. The plant will comprise the following buildings, of steel construction, having iron roofs and brick and glass walls: Main foundry, 60 x 160 ft., with 30-ft. lean-to; main machine shop, 60 x 140 ft., with 30-ft. lean-to; power house, 38 x 50 ft.

The last named building will be equipped with a 17½ x 21 in. Buckeye engine; 150-kw. Crocker-Wheeler generator and a 72 in. x 18 ft. McIlvaine & Speigel tubular boiler. Two 25-ton traveling cranes, one for the foundry and one for the machine shop, and a 15-ton crane for the former building, will be furnished by the Morgan Engineering Company. Two 18-ton air furnaces will be installed and will be served by 10-ton jib cranes. There will also be a 35-ton cupola and a motor driven Sturtevant blower.

The machine shop equipment will include eight 42 in. x 24 ft. motor driven roll lathes, one 96 x 96 in. x 20 ft. motor driven Betts planer, one 38 in. x 30 ft. Putnam lathe and one 76-in. Betts vertical boring machine, motor driven, furnished by Manning, Maxwell & Moore; also one 31 in. x 20 ft. Bradford turret lathe, one 18 in. x 12 ft. Bradford lathe, one 6-ft. Fosdick standard radial drill, one 32-in. Hamilton drill, one Baker Bros. key-seater, one 34-in. Walcott triple geared shaper, one Whiton centering machine, one Acme bolt cutter, one No. 5 Brown & Sharpe milling machine and one Brown & Sharpe universal grinder, furnished by the E. A. Kinsey

subject to restrictions in regard to building and the sale of liquor. The company began its sale of lots September 3 and its first day's sales aggregated 80 lots, chiefly on the business thoroughfares, for a total of \$184,000. The sales to date aggregate about \$250,000. The demand for lots comes from all parts of the country, though principally from Chicago.

The town is divided into north and south sides, the Grand Calumet River being the dividing line. The north section, between the river and the lake, will be devoted to the steel plant, while south of the river will be mercantile and residence sections. The Grand Calumet winds through a swale about half a mile wide and it is the intention to cut anew and straighten the channel, filling in a section of territory, 1 mile long and ¾ mile wide. The new channel will be 45 ft. wide. The proposed harbor, the contract for the building of which was let to the Great Lakes Dredge & Dock Company, Chicago, will extend from the lake to the river and will be 250 ft. wide and 25 ft. deep.

The business center of the town will be at Broadway and Fifth avenues, where the Gary Land Company will have a large office building at the southwest corner, and it will construct a \$100,000 hotel at the northwest corner of Broadway and Sixth street.

The Ordnance Bureau of the Navy Department September 19 awarded contracts for naval guns and gun forgings, distributing the work between the private bidders and the gun shop at the Washington Navy Yard. The latter reserved for itself the building of four of the 12-in. guns, two of the 10-in. and 98 of the lesser caliber. The Bethlehem Steel Company was awarded a contract for eight 12-in. guns and 44 sets of forgings for smaller caliber. The Midvale Steel Company received the contract for four 12-in. guns and 78 sets of forgings. The Crucible Steel Company of America received the contract for 32 sets of 3-in. gun forgings.

The National Motor Driven Compressor

The National Brake & Electric Company, Milwaukee, Wis., is bringing out for use on electric cars a new line of motor driven compressors, which differ from other makes of motor compressors having the motor on top of the crank chamber in that the motor and compressor are each separate, self-contained and distinct units. Fig. 1 shows the standard type of compressor assembled. The

that the crank shaft is provided with a third bearing in the center, which steadies the crank shaft and supports it at its weakest place and eliminates the tendency of the shaft to fracture in the center. The compressor also runs more quietly and is freer from vibration with this third bearing. The crank shaft and gear are removed by lifting them straight out of the crank chamber, which increases the accessibility of the pump.

The compressor is a standard two-cylinder, single ac-

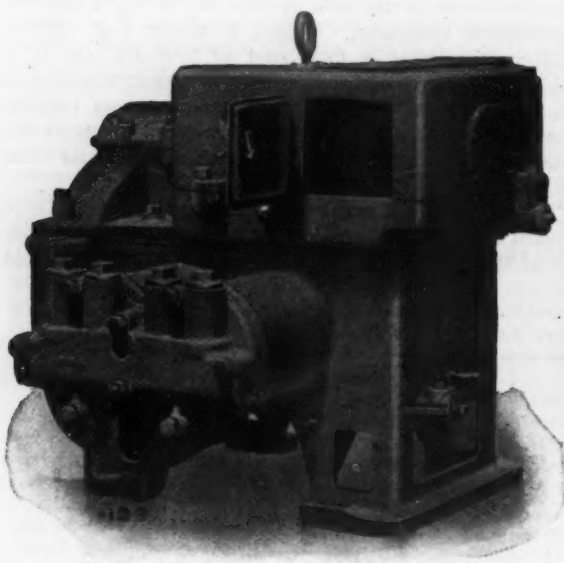


Fig. 1.—The Standard Type of Motor Driven Compressor Made by the National Brake & Electric Company, Milwaukee, Wis.



Fig. 3.—The Crank Chamber of the National Motor Driven Compressor with the Cover Removed.

motor compressor is supported in a cradle under the car. This position leaves the pump exposed to the cooling action of the air and at the same time admits of ready accessibility of all parts. The compressors are made in six different sizes, having capacities in cubic feet of free air per minute of 11, 16, 20, 27, 35 and 50.

As above stated, the compressor and motor are separate units, except that the motor bearing at the pinion

tion type, with trunk pistons. The piston rings are of the Dunbar type. The piston wrist pin on which the tail end of the connecting rod works is steel hardened and secured in place so that it will not become loose. The connecting rod head instead of being loose is connected to the body of the rod by means of a hinge and hinged eye bolt.

Fig. 1 also shows a three-quarter view of the valve head, from which it can be noticed that the discharge valves are placed toward the center and the suction valves toward the outside of the head. The discharge pipe goes straight out from the valve head to the main reservoir, there being no necessity for attaching elbows, &c. The suction has two openings, one at each side of the valve head, and either or both can be used. They are provided with straining screens and the air can either be taken straight into the cylinder or piped from the inside of the car or from the car roof.

The motor is of the standard four-pole consequent pole type, with series wound armature. Two field coils are arranged in a horizontal plane to reduce the over-all height of the motor compressor. Special attention is called to the new type of brush gear which is used, particularly the liberal insulation which has been designed. Its external surface is about $1\frac{1}{4}$ in., as compared with $\frac{3}{4}$ or $\frac{1}{2}$ in. as provided in other compressor motors. An insulating shield is also provided between the bearing and commutator to prevent any chance of a flash over at that point.

Other features of importance include the designing of all cap screws and bolts so that only one size of bolt head is used on any size of compressor, which will enable the furnishing of a standard socket wrench that will facilitate all repair work. The system of oil filling and oil drain holes has been arranged for convenience and slight-

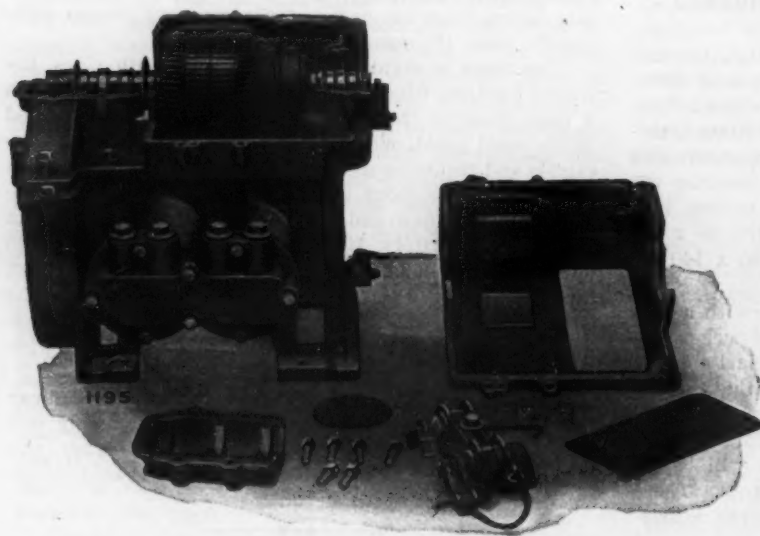


Fig. 2.—The National Motor Driven Compressor Disassembled.

end forms a cover for the top of the gear. There is a $\frac{1}{2}$ -in. air space between the crank chamber cover and the motor base, which prevents the heat being communicated from the compressor to the motor. This separate cover for the crank chamber provides the necessary bracing and stiffening for the crank chamber casting. The simplicity of design and construction and the accessibility of all parts are illustrated in Fig. 2. Fig. 3 shows the crank chamber, with the cover removed. It will be seen

liness. The vent holes for the crank chamber are cast in the side of this chamber, being suitably protected to prevent any danger of oil splashing out, and are of sufficient area to do away entirely with the usual tendency to force the oil vapor and the oil from the crank chamber into the motor bearing and armature. This arrangement dispenses with the unsightly collection of elbows and goose necks sometimes used.

Improvements in Core Making.*

BY W. O. STEELE.

In the original equipment of the foundry of the Bateman Mfg. Company, Grenloch, N. J., a Wadsworth core machine held prominent place. The possibilities of the machine core appealed very strongly to the writer, and while some difficulty was experienced in getting the kind of cores needed, the company persisted, because of the immense ultimate saving if it succeeded. The endeavors were shortly rewarded by what at that time was considered a perfect core. The excellent results obtained from the cores led to continued experiment with the view of greater perfection, until eventually many reamed holes gave place to this new kind of core, thus making a great

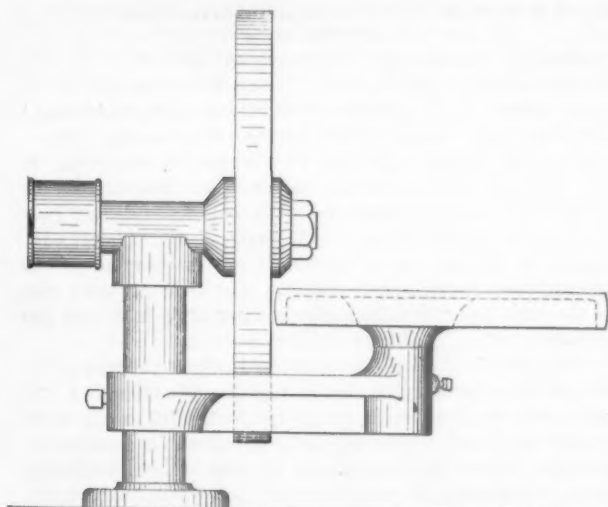


Fig. 1.—An Improved Emery Stand for Coning Cores.

saving in the machine cost of the product and obviating the necessity of putting new machines in already cramped quarters.

This spring the company put a new machine into the field that demanded more machine cores than any of its predecessors, partly from its different nature and partly from the fact that it was designed with the knowledge of machine core possibilities. The requirements were all met, effecting a very marked economy in producing the machine. The demand for this new machine, which is a potato digger, was very great, and the capacity of the hand operated core machine was not equal to the task set for it, nor was it possible for the two experienced men assigned to that duty to cut and cone cores fast enough. This led to the installation of an electric motor for operating the machine. A special emery stand, shown in Fig. 1, was made to take care of the coning and grinding to length. Then came the problem of applying power to the core machine, the requirement being that it should be so arranged that it might be instantly started or stopped—a requirement too exacting for a shifting belt.

All the core machines now on the market, either hand or power, are, so far as the writer knows, geared. This was not desirable, so the old hand wheel with its gears and shafts was removed and the bed extended to include an outboard bearing, as shown in Fig. 2. In place of the driven pinion on the screw shaft, there was substituted a disk with a beveled rim. This disk was set-screwed fast

to the new shaft. Adjacent to this was placed a two-step cone pulley, with the larger step next the disk and the inside of its rim turned to the same angle or bevel as the outer rim of the disk. This cone ran loose on the shaft, the end farthest from the disk being provided with a groove and a strap fitted into it, with a convenient handle attached. To start the machine it is simply necessary to move this cone by means of the handle to engage with the disk, practically a friction clutch pulley, but one in which the movement to engage and disengage is but a fraction of an inch—less than $\frac{1}{8}$ in., as a matter of fact. This rig was inexpensive, works perfectly and has doubled the capacity of the machine, as did the emery stand the capacity for fitting and sizing the cores. The core machine is operated by a 2-in. belt, at 535 rev. per min. The cone was provided to meet emergencies, but it has been found that one speed is sufficiently fast for the smallest core ($\frac{3}{8}$ in.) and not too fast for the largest made ($1\frac{1}{4}$ in.). Holes equal to reamed holes are made in the castings by the use of cores turned out with this equipment, many being but $\frac{1}{16}$ in. larger than the cold rolled shaft on which the casting revolves, or, *vice versa*, in which the shaft revolves.

Foundry Supply Exhibits at Philadelphia.—A meeting of officers of the A. F. A. Exhibit Association with representatives of the Philadelphia Foundrymen's Association was held at Philadelphia recently to make preliminary arrangements for the convention of the American Foundry-

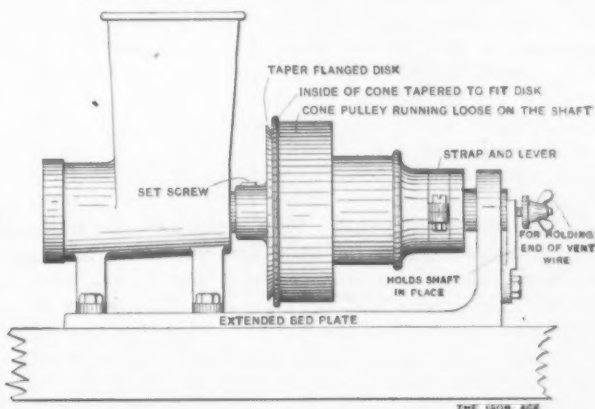


Fig. 2.—A Wadsworth Core Machine Arranged for Power Drive.

men's Association, which will be held in Philadelphia in June, 1907. The A. F. A. Exhibit Association was organized at the Cleveland convention of foundrymen in June of this year. It has undertaken the collection and arrangement of foundry supply and equipment exhibits in connection with the conventions of the American Foundrymen's Association, and will also have charge of the entertainment of the visiting foundrymen. At the recent meeting in Philadelphia arrangements were made for accommodating the exhibits which will be made at the next year's convention and a constitution was adopted for the new association. The Entertainment Committee for the convention will be provided for at the next monthly meeting of the Philadelphia Foundrymen's Association.

The Princess Furnace, at Glen Wilton, Va., has been shut down for necessary repairs, and will be out three or four weeks. It is the intention of the Princess Furnace Company to replace this furnace in the near future with a modern stack, thoroughly up to date. The preliminary plans for the new construction are at present being drawn. The work will be under the charge of J. E. Johnson, Jr., general manager of the company.

The Pacific Hardware & Steel Company, Henry T. Scott and others of San Francisco, Cal., has under consideration the erection of a rolling mill in South San Francisco, where it is understood a site has been selected. Definite plans for the plant have not yet been perfected.

* From a paper read at the meeting of the Associated Foundry Foremen of Philadelphia, September 10, 1906.

The Gayley Dry Blast Process.*

A Proposed German Modification.

BY PROFESSOR B. OSANN OF CLAUSTHAL

To obtain more regular and economical running of the blast furnace Mr. Gayley dries the air, before it enters the blowing tubs of the engine, by reducing the temperature to 23 degrees F. by a system of pipes containing cold brine. The moisture is separated in the form of water and ice, leaving but a small and, as Mr. Gayley especially emphasizes, constant remainder. The considerable expense of installing and operating such a cooling plant is compensated for by a saving in coke of 20 per cent. and 25 per cent. increased production, that is, according to figures published in America.

Why the Gayley Process Has Not Been Introduced on the Continent.

It has been contended that, had these figures been obtained under normal conditions, the saving in coke would have been only about 4 per cent. and, granting that uniformity of moisture in the blast is advantageous, the benefits are too dearly bought. In view also of the many other changing factors which influence the operation of a blast furnace the latter will suffer from irregularity even when the blast is dried. Furthermore, it would be much cheaper to regulate the varying proportions of moisture by adding the necessary amount of steam artificially.

Such objections have had the result that to date not a single blast drying plant has been installed on the Continent, in spite of the lively interest awakened by the Gayley invention. This is greatly to be regretted, because the introduction of refrigerating machinery into metallurgical practice has been thereby prevented or at least delayed, and with it all the progress which it should, and it is to be hoped may yet, bring. To mention but one possible field, the use of dry blast in the Bessemer process is suggested. Here conditions are much more favorable than at the blast furnace, for a ton of iron blown in the converter requires per minute only one-sixth to one-seventh of the blast needed for a ton of iron in the furnace, and the relative expense of cooling the air would be in the same proportion. As a consequence the cost would be returned if, for instance, the consumption of ferromanganese were reduced from 1 to 0.95 per cent. as a result of dry blast, to say nothing of an improvement in quality which may, under certain circumstances, show advantages exceeding all expectations.

German Calculations Show Very Limited Economy.

Returning to the blast furnace, the German authority shortly summarizes the results of calculations formerly published by him to prove that the effects intended by Mr. Gayley are not realized. By the dry blast process there is obtained, besides a saving in coke of approximately 4 per cent., a reduction in the work of the blowing engines of 15 per cent. and a saving in general costs of 4 per cent. Taking the price of coke as \$5.75, and of coal as \$4.50 per ton, which were the current prices in the Minette District a year ago, the cost of production of one ton of pig will be reduced \$0.35. Against these figures must be set the amounts to be written off for depreciation and cost of operation, a total of \$0.27 per ton. This leaves a profit of 8¼ cents to pay interest on the capital invested in the refrigerating machinery, which would yield about 8 per cent., *nota bene*, when using the high-fuel prices existing in the Minette District. A similar calculation for the Ruhr coal district showed a profit of only 1½ cents per ton of pig, equivalent to 1.6 per cent. interest. But even 8 per cent. and 1.6 per cent., respectively, cannot be sustained; they are based on an average temperature of the atmosphere of 68 degrees F. and a moisture of 5.24 grains per cubic foot, figures much too high for European latitudes, which were chosen to agree with those of Mr. Gayley's experimental months. If a satisfactory result

could not be shown under these conditions it would be impossible anywhere.

If, in order to minimize this error, an average of 54.5 degrees F. and 3.76 grains per cubic foot is assumed, as is done in the following calculations relating to the Minette District, the interest on the capital invested sinks to 1.3 per cent., and it is not, therefore, a paying proposition. Even for furnaces in low latitudes, such, for instance, as those of Alabama, where the average temperature for the year is 68 degrees F., the calculated interest amounts to only 7.5 per cent. An attempted change by taking 32 degrees F. instead of 23 degrees F. as the temperature to which the air should be regularly reduced yielded a negative result, the interest shown being lower, and this was still more the case when a cooling limit of 41 degrees F. was used.

The author finally succeeded in finding a remedy after the cause of the failures had become clear. The high capitalization neutralized all the economies resulting from the refrigerating machinery, and this high capitalization was due to the fact that the machinery was calculated to take care of the air at the maximum temperature, in order that it might fulfill the function of supplying to the furnace, every day of the year, air containing the same percentage of moisture. Once this fact was recognized it was not difficult to modify the process usefully.

The Air Must Be Cooled a Fixed Amount and Not to a Fixed Point,

as done by Mr. Gayley. This amount should be the difference between 23 degrees F. and the average yearly temperature; in the Minette District, for instance, it would therefore be $9 + 22.5 = 31.5$ degrees F., whereby $3.76 - 1.40 = 2.27$ grains per cubic foot would be removed. It follows that in the warmer seasons the temperature of the entering air will exceed 23 degrees F., and may possibly reach a maximum of 59 degrees F. There will, therefore, be no such constancy in the percentage of moisture as Mr. Gayley regards essential, at least not in the half year in which the temperature is above the average.

But why is this so important? In blast furnace practice constantly varying conditions in the nature of the coke and the burden have to be contended with, even if only size and percentage of moisture are considered. Further, there are variations in the reactions taking place in the furnace, such, for instance, as the separation of finely divided carbon, and, finally, frequent variations in the care exercised by the workmen. If the point is made that it is the sudden changes in the amount of atmospheric moisture, at some seasons taking place several times in one day,* which react so injuriously on the working of the furnace, this doubt, even if justified, must vanish in view of the large amount of cooling fluid stored in the pipes. Variations of short duration will then be scarcely measurable and in general the zig-zag line of the chart will be converted into a gentle undulation.

Varying Climatic Conditions An Important Consideration.

It will probably not be disputed that furnaces in hot countries suffer most from the evils incident to high temperature and high percentage of moisture in the air. In a distinctly Continental climate, with sudden changes in temperature between day and night, and with hot summers and cold winters in addition, the situation becomes still worse. Such a description of the climatic conditions is applicable to the United States. The furnace plants of the Pittsburgh District are in the same latitude as Naples, those of Tennessee and Alabama in that of Gibraltar and Alexandria. It is easy to understand, therefore, why the agitation for dry blast originated with American furnacemen. The colder and less variable the climate the more favorable are the conditions.

The use of refrigerating machinery in the way here suggested would create conditions such as exist in districts traversed by the isothermic line representing a yearly average of 23 degrees F. and in a climate subject to the influences of the ocean. Such districts are very

* Condensed from *Stahl und Eisen*.

* See Campbell's "Blast Furnace Conditions in Tennessee."

far north. The 23 degrees F. isotherm touches Europe only in the northeastern corner, passes thence close to the southern point of Spitzbergen, leaves Iceland pretty far to the south and cuts off southern Greenland. Whatever the conditions, the suggested arrangement will result in a saving of coke corresponding to a percentage of moisture of about 2.27 grains per cubic foot. The work of the blowing engines will be diminished correspondingly to the cooling of the air, while the general costs will be reduced in proportion to the increased production attained by the saving in coke. If calculations based on these figures show a sufficient interest on the capital invested, after deductions have been made for depreciation and operating, then such an installation is justified.

Some Advantages of Refrigerating Machinery.

Another point is that if the refrigerating machinery is installed it will lead to a more exact observation of the moisture in the air and the temperature of the latter and consequent regulation of the engines, whereby many undesirable surprises will be avoided. Furthermore, there is little doubt that once refrigerating machinery is introduced it will quickly conquer fresh fields for itself. If suitably arranged, such machinery may be used in many places for far-reaching experiments. Cooling the blast for the Bessemer process was suggested above; the cleaning of blast furnace gas is another field.

Furthermore, such machinery can be used to quicken or to bring about a change in the working of a furnace. This is sometimes much to be desired, especially with furnaces which have a tendency to hang or which have formed dust pockets and fallen back in their production. In this connection the arrangement might be such that each furnace could be connected with the refrigerating machinery individually. If a furnace is going cold, the refrigerator may be used direct as a heat bringer, for it relieves the furnace immediately of the loss of heat due to disassociation of the moisture in the air, while the blowing engine is relieved at the same time.

It is important to note that a refrigerating plant such as here suggested would require a much smaller outlay of capital. In one of the following examples (Minette District) the outlay for such a plant for a 250-ton furnace would be \$35,000, whereas according to Mr. Gayley's plans it would be \$108,750. If it is believed, however, that results can only be achieved by the path pointed out by Mr. Gayley, extensions can be provided for, or the refrigerating plants of three furnaces can be concentrated on one of them, in order that his method may be used. If this does not show a profit the Osann method of working may be resumed.

The reader will see from the following examples the net profit and the interest charges for the various furnace districts. For the Minette District, which is the most interested, the net profit works out to 21 per cent., amply sufficient to justify the plant.

Explanation of Table I.

These three examples are supposed to correspond with the climatic conditions of various blast furnace plants.

figures, thus, 50 degrees F. = 121,830 cu. ft. \times 1.79 grains = 31 lb.

The saving in coke is $1.4 \times 1.2 = 1.7$ per cent., because 1 lb. of water vapor requires 1 lb. of carbon to disassociate it, equivalent to approximately 1.2 lb. coke. This saving is accompanied by another, due to the increased temperature of the blast, owing to the less volume passing through the stoves, which amounts to 12 per cent. of that calculated above. Therefore, saving in coke at 50 degrees F. air temperature = 1.7 per cent., to which must be added $0.12 \times 1.7 = 0.2$ per cent., or a total of 1.9 per cent.

The saving in work of blowing engines is made up of two factors: 1. At the decreased temperature a greater weight of air is delivered to the furnace with the same expenditure of energy. 2. The saving in coke per ton causes a corresponding decrease of work on the engine. Thus a saving in coke of 1.9 per cent. means a saving in work of 1.9 per cent.

As to indicated horsepower, a blast pressure of 7.35 lb. per square inch is assumed. To the theoretical work required by the amounts of blast given in the above table, an addition of 25 per cent. has been made to take care of leaks and similar factors.

The saving in general costs would correspond exactly to the saving in coke, so that if the latter is 1.9 per cent., the former would be 1.9 per cent.

In the summary given below the general costs are assumed to be 75 cents per ton.

Explanation of Table II.

The heat contained in 1 lb. of water vapor removed by refrigeration is made up as follows:

1. To cool 1 lb. of water vapor down to the temperature of saturation.
 2. To transform 1 lb. of water vapor to water and cool it down to 32 degrees F.
 3. To transform 1 lb. of water at 32 degrees to ice at the same temperature.
 4. To cool 1 lb. of ice from 32 degrees to 23 degrees.
- The heat removed from 1 cu. ft. of air is made up from (1) that required to cool the air and (2) that required to condense the water vapor.

As to air cooled per hour, according to Table I, there are delivered to the furnace 121,830 cu. ft. of air per ton of pig iron; therefore, as the production per hour = $250,000 \div 24 = 10.4$ tons, the quantity of air per hour will be $10.4 \times 121,830 = 1,393,735$ cu. ft. To compensate for leaks and other losses 10 per cent. is added, making the total 1,391,386 cu. ft. The quantity of heat removed hourly is now simply found, being the product $0.797 \times 1,391,386 = 1,107,072$ B.t.u.

Capital Outlay and Operating Cost.

In calculating the capital outlay required for a refrigerating plant and the cost of operating it the following data are used: For cooling down to 23 degrees F., every 100,000 calories (396,800 B.t.u.) withdrawn per hour will require \$10,250 capital (excluding cost of boilers), 38 i.h.p. and 475 gal. of brine at 50 degrees F.

Table I.—Economies Resulting from Dry Blast.

Exam- ple. No.	Temperature and moisture of air.— Before			Reduced by refrigeration.		Blast Moisture vol- ex- tracted		Saving in general costs. Per ct.		
	Deg. F.	Grains per cu. ft.	After refrigeration.	Deg. F.	Gr. per cu. ft.	ume per ton iron.	per ton pig.			
									Saving in coke.	Saving in engine work.
Based on Average Temperature of Air.										Per cent. and horsepower.
1	50	3.28	23° F., 1.49 gr. per ft.	27	1.79	121,830	31	1.7 + 0.2 = 1.9	8 % of 663 i.h.p. = 63	1.9
2	59	4.20	23° F., 1.49 gr. per ft.	36	2.71	123,600	48	2.6 + 0.31 = 2.91	11 % of 678 i.h.p. = 75	2.9
3	68	5.64	23° F., 1.49 gr. per ft.	45	4.15	125,370	75	4.1 + 0.5 = 4.6	13 % of 687 i.h.p. = 89	4.6
Based on Maximum Temperature of Air.										
1	86	8.74	Same as above.	63	7.25	130,310	134	7.3 + 0.9 = 8.2	20 % of 714 i.h.p. = 143	8.2
2	95	11.35	Same as above.	72	9.87	132,430	187	10.2 + 1.3 = 11.5	26 % of 726 i.h.p. = 189	11.5
3	104	14.42	Same as above.	81	12.93	133,840	247	13.4 + 1.7 = 15.1	31 % of 734 i.h.p. = 227	15.1

The moisture in the air is in general placed at 75 per cent. of saturation. The maximum temperature is assumed at 36 degrees F. higher than the yearly average. Production is supposed to be 250 tons daily. The blast volume is based on the assumption that 2352 lb. of coke are used per ton of pig, and that 79 per cent. of the coke is available carbon.

The moisture extracted is deduced directly from these

The steam cost per 1000 hp. hours is determined as follows:

	Cents.
1. Fuel, 1830 lbs. coal.....	*
2. Depreciation of and repairs to boiler plant.....	18.75
3. Labor, including boiler cleaning.....	25.25
4. Boiler feed water.....	1.75
Total	45.75

* The outlay for fuel must be added to suit local conditions.

A summary of the amounts involved and calculation of profit follow:

A Minette District.

The average yearly temperature is here 50 degrees F. and the moisture is 3.28 grains per cubic foot. Example 1 of the above tables should therefore be used, but in view of the unfavorable conditions at the furnace plants the average between examples 1 and 2 is taken. This will make the average temperature 54.5 degrees F.

There will therefore in the warmer half of the year be a profit of 11 cents, in the colder half a profit of 5.75 cents, or an average of 8.75 cents, which corresponds to a profit of $\frac{1}{4} \times 28 = 21$ per cent. This interest would seem amply sufficient.

B. Rhineland-Westphalia.

The climatic conditions correspond with those of the Minette District. The price of coal is \$2.875 and of coke \$4.25 per ton; cost per 1000 l.h.p. hours = \$2.85.

Table II.—Work of Refrigeration.

Exam- ple. No.	Temperature and moisture of air.—			Reduced by refrigeration. Deg. F.	Gr. per cu. ft.	Heat removed in water vapor. B.t.u. per lb.	Heat removed in air.—			Air cooled per hour. Cubic feet.	Heat removed per hour. B.t.u.
	Before refrigeration. Deg. F.	Grains per cu. ft.	After refrigeration.				(1) For cooling air. B.t.u. per cu. foot.	(2) For condens. B.t.u. per cu. foot.	Total. B.t.u. per cu. foot.		
Based on Average Temperature of Air.											
1	50	3.28	23° F., 1.49 gr. per ft.	27	1.79	1,246	0.483	0.314	0.797	1,391,386	1,107,072
2	59	4.20	23° F., 1.49 gr. per ft.	36	2.71	1,249	0.640	0.483	1.123	1,412,580	1,587,200
3	68	5.64	23° F., 1.49 gr. per ft.	45	4.15	1,251	0.809	0.742	1.551	1,433,769	2,122,080
Based on Maximum Temperature of Air.											
1	86	8.74	Same as above.	63	7.25	1,258	1.078	1.303	2.381	1,486,740	3,543,424
2	95	11.35	Same as above.	72	9.87	1,260	1.190	1.774	2.964	1,514,992	4,495,744
3	104	14.42	Same as above.	81	12.93	1,264	1.325	2.336	3.661	1,529,117	5,602,816

and moisture 3.75 grains per cubic foot, and the maximum 90.5 degrees F. and 10.05 grains. The coke is figured at \$6.25 and the coal at \$4.75 per ton. The cost of steam per 1000 l.h.p. hours will therefore be \$4.40, or approximately \$4.50.

Saving per Ton of Pig Iron.—Daily Production, 250 Tons.

	Cents.
1. Saving in coke $\frac{119 + 2.91}{2} = 2.4$ per cent. of a coke consumption of 2535 lbs. per ton pig = 61¼ lbs.	17.50
2. Saving in work of blowing engine $\frac{53 + 75}{2} = 64$ l.h.p. As in one hour 10.4 tons of pig are produced, the saving will be 0.1 l.h.p. hrs.	2.75
3. General costs, 2.4 per cent. of 75 cents.	1.75
Total	22.00

Against this must be placed the outlay for the refrigerating plant. The following table shows this figured according to Gayley's plans and also according to Osann's suggested modification:

Cost of Operating Cooling Plant per Ton of Pig Iron.—Minette District.

	Gayley's plan.	Osann's modification.
Amount of cooling, B.t.u.	4,206,080	1,349,120
Capital outlay, excluding boilers.	\$108,750	\$35,000
Maximum horse-power, l.h.	403	129
Cooling liquid (brine), per hour, gals.	50,462	16,116
	Cents.	Cents.
1. Depreciation and repairs, 10 per cent. of the capital, divided among 91,000 tons of pig iron.	12.	3.75
2. Power (an average of 129 l.h.p. being used), \$4.50 per 1000 l.h.p. hrs., divided among 10.4 tons of pig iron.	5.5 0.5*	5.5
3. Cooling water, divided among 10.4 tons of pig iron.	0.75	0.75
4. Labor, 15 and 7.5 cents per hour, respectively, divided among 10.4 tons of pig iron.	1.5	0.75
5. Lubricants, 1.75 cents per hour, divided among 10.4 tons of pig iron.	0.25	0.25
Totals	20.5	11.

* 0.5 added on account of higher initial cost of boiler plant.

Therefore the profit will be:

(a) Gayley's process, 22 — 20.5 = 1.5 cents.

(b) Osann's modification, 22 — 11 = 11 cents.

On an output of 91,000 tons of pig iron yearly the profit will be:

(a) = \$1500 (?) = 1.3 per cent. on capital.

(b) = \$10,000 = 28 per cent. on capital.

These figures, however, must be reduced, owing to the fact that the plant is not used to its full capacity whenever the temperature of the air falls below the average. An examination of the average temperature by quarter years shows that in the cooler half of the year the amount of cooling performed will be reduced about 33 per cent, and the profit will diminish in the same proportion. On the other hand, the cost for brine and power can also be reduced one-third in this half year.

Saving per Ton of Pig Iron.—Daily Production, 250 Tons.

	Cents.
1. Saving in coke = 2.4 per cent. of coke consumption, 2249 lbs. = 53 lbs. at \$4.25.	10.25
2. Saving in engine work, 64 l.h.p. hrs., 18 cents for 10.4 tons of pig iron.	1.75
3. Saving in general costs, 2.4 per cent. of 75 cents.	1.75
Total	13.75

Cost of Operating Cooling Plant per Ton of Pig Iron.—Rhineland, Westphalia.

	Gayley.	Osann.
Amount of cooling, B.t.u.	4,206,080	1,349,120
Capital outlay.	\$108,750	\$35,000
Maximum horse-power, l.h.p.	403	129
Cooling fluid per hour, gallons.	50,462	16,116
	Cents.	Cents.
1. Depreciation and repairs; 10 per cent. capital divided by 91,000 tons.	12.	3.75
2. Power; \$2.85 per 1000 l.h.p. hrs. = 37 cents for 129 hp. hrs. divided by 10.4 tons of pig iron.	3.5	3.5
Added	0.5	
3. Brine	0.75	0.75
4. Labor	1.5	0.75
5. Lubricants	0.25	0.25
Totals	18.5	9.

The respective profits would therefore be:

(a) Gayley's process, 13.75 — 18.5 = —4.75 cents (i. e., loss).

(b) Osann's modification, 13.75 — 9 = 4.75 cents.

With a production of 91,000 tons yearly (b) = \$4,322.50, or 12.4 per cent, which, reduced as in the previous example, = $\frac{1}{4} \times 12.4 = 9.3$ per cent. Owing to the lower fuel prices a much lower rate of interest on the capital invested is shown than in the previous example. As the climatic conditions used in the above example would hold good for the whole of Germany the decisive point is simply the cost of fuel.

C. On the 59 Degrees F. Isothermic Line.

The conditions at furnace plants in the neighborhood of the 59-degree F. isothermic line are next considered. This will include the furnaces, for instance, on the south coast of France, in Elba and at Trieste. The average temperature would be 63.5 degrees F. and moisture 4.89 grains; that is, the average between Examples 2 and 3 given above. The price of coke may be taken at \$7.50 and of coal \$6 per ton. This will make the cost of steam \$5.50 approximately per 1000 l.h.p. hours.

Saving per Ton of Pig Iron.—Daily Production, 250 Tons.

	Cents.
1. Saving in coke $\frac{2.9 + 4.6}{2} = 3.75$ per cent. of 2240 lbs. per ton = 82.7 lbs.	28.25
2. Saving in engine work $\frac{75 + 89}{2} = 82$ l.h.p. hrs. = 44½ cents per 10.4 tons.	4.25
3. Saving in general costs, 3.75 per cent. of 75 cents.	3.75
Total	36.25

Cost of Operating Cooling Plant per Ton of Pig Iron.—Triest, Elba, etc.

	Gayley.	Osann.
Amount of cooling, B.t.u.	5,245,700	1,904,640
Capital outlay.	\$135,250	\$49,250
Maximum power, l.h.p.	502	182
Cooling fluid per hour, gallons.	62,880	22,720

	Cents.	Cents.
1. Depreciation and repairs; 10 per cent. of capital divided by 91,000 tons...	15.	5.5
2. Power: \$4.50 per 1000 l.h.p. hrs. divided by 10.4 tons; 182 l.h.p. hrs...	10.	10.
Added	0.75	
3. Brine	1.	1.
4. Labor	1.5	0.75
5. Lubricants	0.25	0.25
Totals	28.5	17.5

Therefore the profits would be:

(a) Gayley's process: $35.25 - 28.5 = 6.75$ cents, or \$6250 per year, equal to 4.6 per cent. on the capital.

(b) Osann's modification: $35.25 - 17.5 = 17.75$ cents, or \$16,250 per year, equal to 33 per cent. on the capital, which, for the reason stated in Example A, must be reduced to $\frac{1}{4} \times 33 = 25$ per cent.

D. Alabama.

The blast furnaces in Alabama lie still further south. The profits due to the introduction of refrigerating machinery will, therefore, be still larger.

Summary of Results.

District.	Saving in coke. %	Investment needed.		Profit on Investment.	
		Gayley.	Osann.	Gayley.	Osann.
Minette District.....	2.4	108,750	35,000	1.3	21
Rhineland-Westphalia ...	2.4	108,750	35,000 (Loss)		9.3
Triest, Elba, &c.....	3.75	135,250	49,250	4.6	25

In the above the profits due to more uniform working of the furnace and other advantages mentioned above are disregarded, as they cannot be expressed in figures.

Calculations for a Bessemer Refrigerating Plant.

The plant is supposed to have 15-ton vessels (15 tons of ingots per heat) making a daily production of 1200 tons. The climatic conditions are those of the Minette District. The blowing tub pistons pass a volume of 19,070 cu. ft. per minute, while the steam cylinders indicate 1750 hp. The blast is to be cooled to 23 degrees F. This will cause a saving in work on the engine which, according to Table I, amounts to the average of 8 and 11 per cent. or 9.5 per cent., or 166-l.h.p. hours. This costs at \$4.50 per 1000-hp. hours, 75 cents. As 50 tons of ingots are produced per hour the saving will be $1\frac{1}{2}$ cents per ton.

The costs of the refrigerating plant must now be calculated, the capital outlay being figured for the maximum temperature—i. e., 90.5 degrees F., with 10.05 grains moisture per cubic foot. The operating costs must be based on the average temperature, 54.5 degrees F. and 3.75 grains moisture per cubic foot. Taking at the maximum temperature 20,412 cu. ft. as the volume of air per minute, or in round numbers 1,236,400 cu. ft. per hour, so that the amount of heat to be absorbed (Table II) is 3,333,000 B.t.u., the average amount of heat absorbed is 1,127,000 B.t.u.

The capital required, being \$10,250 per 100,000 calories withdrawn per hour, is 8.4 times that amount, or \$86,200; the average power is $2.9 \times 38 = 110$ h. p., and the average quantity of brine is 13,740 gal.

Costs for One Hour.

1. Depreciation and repairs (yearly 10 per cent. of the capital)	\$1.20
2. Power .....	.495
Extra for depreciation of boiler plant.....	.0425
3. Brine .....	.065
4. Labor in refrigerating plant.....	.15
5. Lubricants .....	.0175

Total per hour (50 tons ingots).....	\$1.97
Per ton.....	.04
Deduct saving in blowing engine.....	.015

Balance, operating cost per ton.....\$0.025

If it should be possible to reduce the amount of ferromanganese used from 1 per cent. to 0.95 per cent., this would be a saving of 1.1 pounds per ton, worth 31 cents—i. e., far more than the 0.025 cents cost of operating shown above.

In view especially of the rôle played by the hydrogen derived from the moisture in the air, and perhaps also by the oxygen from the same source, in respect to the phenomena of solidification, blow holes and tensile strength, an experiment in the direction indicated would, from a business point of view, be entirely justified, as in

all probability a comparatively small outlay would result in an extraordinary profit.

In evidence reference is made to the original researches of Mueller,* who caught the gas which escaped when drilling ingots and obtained, even with solid ingots, a gas volume of over 60 per cent. of the size of the hole drilled and containing 70 to 92 per cent. of hydrogen. According to the theory established by Mueller, all deoxidizing agents only act by preventing the liberation of large amounts of gas during pouring and solidification. If the amount of the imprisoned gas is diminished, and this is done if the hydrogen is cut off at its source, the amount of deoxidizing material can also undergo a reduction.

Professor Osann also recalls the unfavorable influence of hydrogen on the tensile strength shown in various ways, such as brittleness, surface cracks, &c., in steel, which had taken up 0.028 per cent. of hydrogen by being heated in a leaky muffle, and the superiority of crucible steel over Bessemer or open hearth. Heyn† even suggests that hydrogen is taken up in large quantities when the heats are very hot and then acts unfavorably on the quality of the steel.

The Northern Malleable Foundry.

The Northern Malleable Iron Company, St. Paul, Minn., has purchased from the St. Paul Title & Trust Company, trustee for the owners, a tract of between 7 and 8 acres of the property formerly occupied by the Bohn Mfg. Company, and will build a large malleable iron plant. The buildings will be of steel and concrete construction, the main structure having dimensions 110 x 900 ft. Its equipment will consist of three melting furnaces and the proper proportion of annealing ovens. For the present the plant will be run by electricity secured from a local plant, but the company will probably soon be in the market for equipment to supply its own power. It is in the market at present, however, for motors, cranes, molding machines, squeezers and other machinery necessary for the operation of a malleable foundry.

The company now occupies a portion of the buildings owned and operated by the International Flax Twine Company, formerly the plant of the Walter A. Wood Harvester Company, at Hazel Park, Minn. The business of both companies has increased so rapidly that it has become necessary for the Malleable Iron Company to move into a plant with adequate facilities for its needs. The company proposes to begin immediately the construction of the buildings which will involve an initial cost of \$100,000. It employs at present 300 men and when the new plant is completed the working force will be increased to 500.

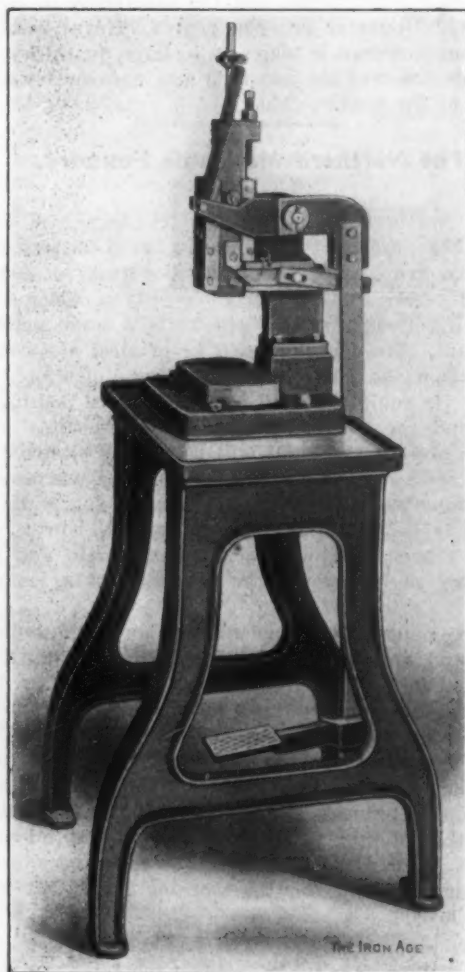
A Pig Iron Handbook.—Hickman, Williams & Co., with offices in the Rookery Building, Chicago; American National Bank Building, Louisville; Union Trust Building, Cincinnati; Commonwealth Trust Building, St. Louis, and German National Bank Building, Pittsburgh, have issued a book which will be found of much value by foundrymen. It presents articles by the well-known foundry chemists, W. G. Scott, Racine, Wis., and Herbert E. Field, Pittsburgh, Pa., on the effect of variation in constituents of cast iron, and suggestions concerning mixtures of iron. An article by H. L. Williams of the firm treats of the metalloids of iron and their effect on the character of the product. The book also gives approximate analyses for various kinds of castings, analyses of the different brands of pig iron handled by the firm and analyses of standard Bessemer, malleable Bessemer and basic pig irons, as well as analyses of standard cokes. It also gives tables showing monthly prices for 10 years of iron and steel at various points, production and consumption of pig iron in the United States for a long series of years, &c. Blank pages are provided in which a large number of analyses of iron can be entered under printed headings. The book is of pocket size and substantially bound in flexible leather.

* Stahl und Eisen, 1882 et seq.

† Stahl und Eisen, 1900, No. 16, page 839.

The Phoenix Spring Foot Press.

The machine illustrated, a spring foot press, is a compromise between the ordinary foot press and a light drop hammer, being particularly intended for work requiring a sharp, quick blow, as in riveting, forming, swaging, assembling, &c. It is made by the Phoenix Iron Works Corporation, 57 Arch street, Hartford, Conn. In most respects it resembles a foot press, the main point of difference being that the force of the blow is controlled by a spring, the tension of which may be varied to suit the work. The blows are uniform, corresponding to any particular setting of the spring, regardless of the care of the operator. It is claimed to be more rapid than the foot press and to be easier on the operator, inasmuch as the jar caused by the stopping of the die on the work is not



A Spring Foot Press Made by the Phoenix Iron Works Corporation, Hartford, Conn.

communicated through the lever to the operator's foot. The force of the blow depends upon both the tension of the spring and the stroke or drop of the slide and is claimed to be easily made more powerful than in a lever foot press of the same weight.

The machine is furnished in one size, either with legs, as shown in the illustration, or without, for mounting on a bench. The height of the table from the floor is about 30 in., and the greatest distance between the lower end of the slide and the bed is $5\frac{1}{4}$ in. The distance from the center of the slide to the column is $2\frac{3}{4}$ in. A floor space of about 24 x 24 in. is required.

Sir William Henry Perkin has accepted an invitation to be present at the celebration of the Perkin jubilee of the coal tar industry as the guest of a committee of 15 formed under the auspices of the Chemists' Club, New York, for the express purpose of celebrating the Perkin jubilee of the coal tar industry. Dr. Perkin is due in New York on September 29, and the banquet will

be held October 6 at 7 p.m. A symposium on the coal tar industry will follow the banquet, at which the first Perkin medal and a silver tea service, as a personal token, will be presented to Sir William.

Shrinkage and Contraction in Cast Iron.

At the third annual convention of the British Foundrymen's Association, held on August 7 and 8, 1906, at Middlesboro, England, a question came up for discussion that has been a prolific topic at similar meetings in this country. Professor Turner made the point that metals shrink as a rule according to their melting point, the higher the melting point the greater the shrinkage; also that shrinkage depends on the size of the casting, and that steel shrinks more than cast iron, which latter shrinks more than the majority of metals with a low melting point. Percy Longmuir, Sheffield, preferred to regard shrinkage as taking place in liquid metal, while contraction occurs entirely in the solid.

Robert Buchanan, ex-president of the association, said: "In the Birmingham District we talk about a liquid contraction as sinking. The Scotchman talks of it as drawing. After the metal has taken solid form we call that contraction. I believe there are many differences of opinion as to the causes of sinking or drawing holes. In the foundry one often hears a great deal of difference of opinion as to whether a certain hole is a blowhole or a sinking hole. When one sees the hole with a light, shining surface I usually put that down to blowing. When it is dark I put it down to sinking or drawing. Where the shrinkage hole is dark the gases from the coal have entered into that hole and so darkened the interior, just as the exterior of the casting is darkened. On one question which has been raised—warping—I make bold to say that there is no subject connected with foundry practice about which less is known. It would be a matter of the greatest possible profit if one could clearly predict how a casting is going to come out when it has been cast. Our ideas of crystallization and of contraction are in a very elementary stage at the present moment. As to why a thin casting should contract more than a thick one it is to be said that in the heavy casting you have the larger crystallization and the larger graphite, which occupies a definite position; this means that it contracts less. Until we know more about this subject we are likely to be confounded by shrinkage holes, cooling of castings and warping of castings."

Monel Metal.

The hard service to which gas engine and automobile motor valves are subjected, resulting in the pitting, scoring and breaking of the valve stems after comparatively little use, has created a demand for something better than the material now used. A metal that is tough, strong and noncorrosive, such as pure nickel, would be well suited to this service, but the price, which to some manufacturers takes precedence over quality, has prevented its adoption for this purpose.

The Orford Copper Company, 43 Exchange place, New York, which for some time has been devoting itself to the requirements of manufacturers of gas engines and automobile motors, especially as regards nickel steel forgings of high physical properties, has given this subject much attention and is now placing on the market a natural alloy of nickel and copper, known as Monel metal, that has been found especially adapted for valves, having all the desirable qualities needed and yet at a price which permits of its use in large quantities. The metal drop forges satisfactorily, machines the same as nickel steel valves now furnished, and when touched to a buffing wheel takes a mirror finish and cannot be distinguished, even by experts, from pure nickel. With the co-operation of several of the leading automobile manufacturers this metal, which possesses a high tensile strength and elastic limit with the noncorrosive properties of nickel, has been given a thorough trial and has proved its worth.

Ore Sales at Higher Prices for 1907.

DULUTH, MINN., September 22, 1906.—The price of ore for next year is a matter of considerable moment and anxiety on the part of furnacemen just now. Some sales of Mesaba ore have been made for next year's delivery at 50 cents a ton over this season's base, or on the basis of \$4.75 and \$4.50 for old range and Mesaba Bessemer, respectively. If the advance on non-Bessemer is half as much these will sell at \$4 and \$3.75, respectively. A few small sales of Mesaba non-Bessemer have been made at \$3.75 and higher within the past few days. These prices are not at all above what has been paid for late deliveries of 1906.

There have been Mesaba sales, however, of standard ores above \$4.50 for this fall's delivery. One big mine at Hibbing has sold some ore within the past few weeks at \$4.60 for this fall's delivery, in excess of the 850,000 tons its earlier sales and long term contracts required. During the past few days an off-grade Mesaba ore has been sold for Lake Superior consumption next year at \$4.25, which is a trifle above \$4.50 base, Mesaba. If these sales are to be taken as an index, the advance from 1906 will be more than 50 cents, and many ore sellers are now wondering if they will care to sell at prices under what they have already been offered for immediate delivery.

Republic and Other Companies Active.

The Republic Iron & Steel Company has undertaken a far more vigorous campaign after iron ore than it has carried on in the past, and is taking properties on both the Mesaba and Vermillion ranges. The last of these is the east one-half of the northeast one-quarter of section 25-58-18, for which a royalty of 32 cents a ton has been agreed upon. This is on the lower rim of the iron ore formation, but a little ore has been found on the tract by exploration carried on some years ago. On adjacent land to the east, further up on the formation, which here has a northeast and southwest strike, M. H. Alworth and others are finding ore on land owned by them. This tract has long been considered excellent and is close to a large area owned by the Oliver Iron Mining Company, which was originally in the hands of the Merritts of Duluth. The Republic Company is also taking lands on the Vermillion range and will start exploration there.

A good deal more work is under way in the exploration of hitherto undeveloped tracts on the Mesaba than was expected at this time, and it now looks as though the coming winter would be one of the most active known to the explorers. Exploration constantly becomes more costly as the price of carbons or black diamonds and of other supplies advances. High grade carbons are now selling at from \$75 per carat upward, and it is difficult to get the best grade of stones, such as are required for northern Minnesota work, even at that price. But the reward of successful exploration is greater now than it has ever been, and conditions seem to promise a still further rise in the price of ore.

An Eastern steel making concern has taken a lease on 200 acres near the center of T 56-23 and will explore at once. The Great Northern road has a mine adjoining to the north and the Oliver Iron Mining Company one close by to the west. In this district the surface is rather deep and not of high grade, but washable.

Properties Once Passed By Now in Demand.

On the northeast quarter of section 16-58-17, near the Minnewas, some ore is being found. In common with many so-called new discoveries this is no discovery at all, but merely an appreciation of the fact that deposits that a few years ago were both too low in grade and too small in quantity are now good enough to be called mines and to make money for their operators. This is the fact as to the Mayas mine, east of Mesaba station, which was explored only three years ago by a prominent local operator, who found it so small in tonnage that he turned it over to another party, who also was compelled to abandon it. This year the mine is producing about 125,000 tons, fully half the good ore it contains, at so low a cost and is selling it for so good a profit that the operators will clear up a very large sum. This is also the fact as to the Mariska in 9-58-16, which is a mere fringe

of ore, valueless a few years ago, but now well worth mining, though it may be exhausted in a year or two. Several other "new" Mesaba deposits are of the same character. A further advance of 50 cents in the price of ore over the 1906 base will stimulate the opening of these small and lean deposits heretofore neglected.

The eastern Mesaba exploration of Longyear & Bennett in section 5-58-15, referred to previously, shows a fine hole. The first hole is now bottomed in decomposed jasper and paint rock and is being pushed on down. This hole showed 150 ft. of ore between an upper rock and a lower stratum and 123 ft. more between the lower and the paint rock, in which the drill is now boring. A second hole has been started 300 ft. south of the first and is yet in surface at about 150 ft. depth.

New Work in the Iron River District.

Pickands, Mather & Co. have taken up several explorations in the Iron River District, this being the first time the company has done anything there. Options have been taken on properties in sections 23 and 25-43-35, near the Riverton mine of the Oliver Iron Mining Company and the properties of the Mineral Mining Company, and mean a considerable impetus to explorations in the region surrounding Iron River. It is said that the Cleveland-Cliffs Iron Company is anticipating entrance to this district, and it is certain that this company has been making preliminary examination, but so far as known without having taken any action toward exploration thereabouts.

The Marinette Iron Company, in which officials of the Wisconsin & Michigan Railway are interested, has begun shaft sinking in section 6, near Iron Mountain, to prove an ore body found by crosscuts and test pits. It is reported that the preliminary work was quite favorable and that a considerable body of fair grade ore is already shown to exist.

At its new "C" Ludington shaft the Oliver Company is to erect a great Custodis stack, 135 ft. high, which will be the nineteenth Custodis stack the company has in use, most of them on the Western ranges. This shaft is the new steel lined Chapin hoisting way and is about finished. It is one of the largest ever constructed and holds two hoisting ways besides the enormous Cornish pump of 3000 gal. capacity, and timber and man ways. It is vertical and built of steel frames and rails.

No. 4 ore dock of the Duluth, Missabe & Northern Railroad is so far completed that one side has been in service this week, and the shipping capacity of the road is correspondingly increased, though it is even yet unable to keep pace with the shipping that presses for cargoes. This pier will have capacity for the storage of 119,000 gross tons of ore, and the officials of the road expect to break all records for speed of handling ore when it is fully in use. It has been carefully planned for speedy and economical operation and is costing about \$1,000,000. The entire dock will not be completed in time for use this year.

The Henry H. Rogers, one of the latest of the United States Steel Corporation's 600-ft. vessels, has broken the record for ore loads by taking from Escanaba to Chicago a cargo of 13,333 gross, or 14,933 net, tons. This was on a draft of 21.5 ft., and was possible from Escanaba only, since connecting channels out of Lake Superior are not deep enough to permit vessels in the Superior trade to load as low.

D. E. W.

It was reported at the recent twenty-fifth annual convention of the New England Water Works Association in the White Mountains that the standard specifications for cast iron pipe adopted by the association had been received with great interest by engineers. Two pipe works have adopted it, but the United States Cast Iron Pipe & Foundry Company does not book orders under it. The American Water Works Association and the American Society for Testing Materials have not yet been able to agree on a specification.

The steamer Carmania of the Cunard Line arrived at New York September 19 with \$15,278,500 in gold, which is said to be the largest single shipment ever landed in this country.

Figuring Brass Work Costs.

Wm. M. Webster, commissioner of the National Association of Brass Manufacturers, 1110-1112 Schiller Building, Chicago, Ill., has issued an interesting and instructive 28-page pamphlet, entitled "How to Figure Costs in the Brass Business." It presents a complete cost system for this branch of trade, and is stated to be the "result of the combined opinions and experience of a number of manufacturers who have not only given the matter careful study, but who have made a success of their own business." The purpose of the publication is to secure better methods of ascertaining costs than those usually in vogue, as many manufacturers are believed to be doing business without actually knowing what their costs are or else are under the impression that they are doing business at a profit when in reality they are doing it at a loss. The following preliminary explanations are given, with the statement that the forms may be used regardless of the kind of brass goods made:

The foundry costs are arrived at by simply inventorying everything on hand on the first day of each month, recording everything purchased during the month, and keeping an account of all wages paid and castings produced.

Some of the foundry items of expense—for instance, molding and core sands—have been included in Section XI of general expense, because of the difficulty of inventorying such items each month.

The total expense, exclusive of selling expense and out freight, has been tabulated, so as to preclude the possibility of forgetting any of the items. The bookkeeper can tell at once what this total expense, less selling expense and out freight, amounts to for the past year, and it will therefore not be necessary to make a new itemized expense account, the idea in tabulating the items being only to show what is included. It is probable that you have charged in your books to total expense the items included in foundry costs (see Section II), and if so these must be deducted (see Section XII).

The bookkeeper will also be able to give the total amount paid in wages during the past year; all that is necessary to figure is the amount paid during the past year for nonproductive labor (see Section XIII). This deducted from total labor account will give the amount paid for productive labor during the year (see Section XIV).

The percentage of total expense (less selling expense and out freight) is next figured on the productive labor (see Section XIV). This percentage is in turn added to the cost of the finishing and polishing labor on each article. It is in this necessary addition of percentage of expense that our costs differ and it is the most important item of cost figuring.

The No. 4½ Fuller bath cock has been selected for an example, as it is one of the most complicated articles of staple plumbers' brass goods and the one on which our several costs differ most, to judge from the varying prices it is sold at.

You will therefore proceed as follows:

Determine cost of castings for the present month as in Sections I to X.

Determine total expense for previous year as in Sections XI and XII.

Determine total nonproductive labor in previous year as in Section XIII.

Determine total wages paid for productive labor in previous years as in Section XIV.

Add total expense to nonproductive labor, to ascertain amount which must be carried by, and added to, productive labor in polishing and finishing departments (see Section XIV).

Figure percentage which must be added to finishing and polishing labor as in Section XV.

Separate and tabulate for each part of the No. 4½ bath cock: Rough weight, finished weight, finishing labor and polishing labor, as in Section XVI.

Figure borings from cock as in Section XVI.

Find cost of materials used on cock outside of castings as in Section XVII.

Determine productive labor used on cock as in Section XVIII.

Summarize cost of finished cock as in section XIX.

A summary of the several sections into which the system is divided is as follows:

- 1—Inventory of metals on hand on the first day of present month as in Sec. 1...pounds. Value, \$.....
- 2—Inventory of supplies on hand in foundry on the first day of present month as in Sec. 2...Value, \$.....
- 3—Enter all metals bought during month as in Sec. 3.....pounds. Value, \$.....
- 4—Enter all supplies bought during month as in Sec. 4.....Value, \$.....
- 5—Record all metals returned during month to finishing and polishing departments as in Sec. 5. Pounds.....Value, \$.....
- Deduct from above metals removed from foundry for use in other departments as in Sec. 5. Pounds.....Value, \$.....
- Leaves total.....pounds. Value, \$.....

- 6—Inventory of metals on hand in foundry on first day of following month as in Sec. 6. Pounds.....Value, \$.....
- 7—Inventory of supplies on hand in foundry on first day of following month as in Sec. 7...Value, \$.....
- 8—All wages paid during month in foundry as in Sec. 8.....Amount, \$.....
- 9—Castings produced ready for machinery during month as in Sec. 9, total pounds.....
- Defective and spoiled castings returned to foundry as in Sec. 5,.....pounds, equals.....per cent. of total amount in this section (No. 9)
- 10—Total castings produced during month as in Sec. 10.....pounds.
- Total value.....\$.....
- Equals.....cents per pound.
- 11—Total expense for past year as in Sec. 11.....\$.....
- 12—Wages paid nonproductive labor during past year as in Sec. 13.....\$.....
- 13—Productive labor paid during past year in finishing and polishing department as in Sec. 14.....\$....."B"
- Deduct total foundry labor paid during past year.....\$.....
- Deduct total nonproductive labor paid during past year.....\$....."A"
- Subtract "A" from "B," which leaves productive labor in finishing and polishing departments paid during past year.....\$....."C"
- 14—Amount to be added to productive labor in finishing and polishing departments:
- Total expense as in Sec. 11.....\$.....
- Nonproductive labor as in Sec. 13.....\$.....
- Total.....\$....."D"
- Percentage of result as found in "D".....\$.....
- To productive labor as given in "C".....\$.....
- Which figures.....per cent.

Following are the forms given, the figures inserted being merely arbitrary and only to indicate how entries are to be made.

SECTION I.

Inventory metals on hand in foundry on the first day of present month, as follows:

On hand January 1, 1906, in foundry:

	Pounds.	Price.	Value.
Copper ingot.....	12,793	\$.18	\$2,302.74
Copper scrap, heavy.....	1,358	.16½	224.07
Copper scrap, light.....			
Red brass ingot.....			
Red brass scrap.....			
Yellow brass ingot.....			
Yellow brass scrap, heavy....	2,230	.13	289.90
Yellow brass scrap, light.....			
Phosphor bronze ingot.....			
Phosphor bronze scrap.....			
Zinc ingot.....	4,264	.06½	277.16
Zinc scrap.....	706	.05½	38.83
Lead ingot.....	1,483	.06	88.98
Lead scrap.....	1,352	.05	67.60
Tin ingot.....	272	.39	106.08
Tin scrap.....			
Aluminum ingot.....			
Aluminum scrap.....			
Red borings.....			
Yellow borings.....	260	.11	28.60
Crusher scrap.....	1,020	.11	112.20
Grindings.....	120	.11	13.20
White metal.....			
Antimony.....			
Red gates and sprues.....			
Yellow gates and sprues.....	1,820	.13	236.60
Phosphor bronze gates and sprues.....			
Totals.....	27,678		\$3,785.96

SECTION II.

Inventory supplies on hand in foundry on the first day of present month, as follows:

On hand January 1, 1906, in foundry:

Quantity.	Price.	Value.
Supplies—		
40 lb. Facing.....	\$.01½	\$.60
00 lb. Lycopodium.....		
50 lb. Partamol.....	.20	10.00
280 lb. Flour.....	.01½	4.20
00 lb. Dextrine.....		
330 lb. Core compounds.....	.15	49.50
00 lb. Core oil.....		
00 lb. Glue.....		
600 lb. Rosin.....	.01½	9.00
00 lb. Phosphorus.....		
1,300 Numbers crucibles.....	.05	65.00
40 gal. Molasses.....	.13	5.20
470 lb. Core wire.....	.03	14.10
Fuel—		
00 gal. Oil.....		
00 Tons hard coke.....		
1½ Tons gas coke.....	5.00	6.25
11 Tons hard coal.....	7.00	77.00
98 bus. Charcoal kindling.....	.15	14.70
00 Wood kindling.....		
Total.....		\$255.55

Note: Above supplies for foundry are NOT included in total expense. Section XI.

SECTION III.

Enter all metals *bought* during month in order of dating as follows:

Date bought.	Pounds.	Price.	Value.
Jan. 5 Scrap lead.....	284	\$0.05	\$14.20
Jan. 8 Yellow scrap brass....	9,010	.13	1,171.30
Jan. 10 Ingot copper.....	30,326	.18	5,458.68
Jan. 12 Ingot zinc.....	10,108	.06½	657.02
Jan. 15 Pig lead.....	3,516	.06	210.96
Jan. 18 Heavy copper scrap.....	82	.16½	13.53
Totals.....	53,326		\$7 525.69

SECTION IV.

Enter all supplies *bought* during month in order of dating, as follows:

Date bought.	Price.	Value.
January 4. 40½ tons hard coal.....	\$7.00	\$283.50
January 5. 2 tons gas coke.....	5.00	10.00
January 8. 1,900 lb. flour.....	.01½	29.40
January 11 1,000 lb. facing.....	.01½	15.00
January 16. 2,000 numbers crucibles.....	.05	100.00
Total.....		\$437.90

Note: Above supplies are NOT included in total expense. Section XI.

SECTION V.

Record all metals *returned* during month to foundry from Finishing and Polishing Departments as follows:

Metals returned in January, 1906, to foundry. (From Finishing and Polishing Departments.)

Pounds.	Price.	Value.
Red castings, defective.....		
Yellow castings, defective.....	935	\$0.18
Red castings, spoiled.....		
Yellow castings, spoiled.....	2,806	.18
Red borings.....		
Yellow borings.....	21,126	.11
Grindings.....	1,116	.11
Totals.....	25,983	\$3,120.00

Deduct from above metals removed from foundry for use in other departments:

Pounds.	Price.	Value.
Lead.....	21	\$0.06
Tin.....	22	.39
Zinc.....		
Totals.....	43	\$9.84
Leaves totals.....	25,940	\$3,110.16

SECTION VI.

Inventory metals *on hand* in foundry on the first day of following month, as follows:

On hand February 1, 1906, in foundry:

Pounds.	Price.	Value.
Copper ingot.....	6,631	\$0.18
Copper scrap, heavy.....	1,358	.16½
Copper scrap, light.....		
Red brass ingot.....		
Red brass scrap.....		
Yellow brass ingot.....		
Yellow brass scrap, heavy.....	1,860	.13
Yellow brass scrap, light.....		
Phosphor bronze ingot.....		
Phosphor bronze scrap.....		
Zinc ingot.....	2,210	.06½
Zinc scrap.....	456	.05½
Lead ingot.....	769	.06
Lead scrap.....	1,352	.05
Tin ingot.....	248	.39
Tin scrap.....		
Aluminum ingot.....		
Aluminum scrap.....		
Red borings.....		
Yellow borings.....	910	.11
Crusher scrap.....	1,210	.11
Grindings.....		
White metal.....		
Antimony.....		
Red gates and sprues.....		
Yellow gates and sprues.....	1,240	.13
Phosphor bronze gates and sprues.....		
Totals.....	18,244	\$2,433.04

SECTION VII.

Inventory supplies *on hand* in foundry on the first day of following month, as follows:

On hand February 1, 1906, in foundry:

Quantity.	Price.	Value.
Supplies—		
850 lb. facing.....	\$0.01½	\$12.75
00 lb. lycopodium.....		
10 lb. partamol.....	.20	2.00
1,680 lb. flour.....	.01½	25.20
00 lb. dextrine.....		
212 lb. core compounds.....	.15	31.80
00 lb. core oil.....		
400 lb. glue.....		

550 lb. rosin.....	.01½	8.25
00 lb. phosphorus.....		
1,000 Numbers crucibles.....	.05	50.00
270 lb. core wire.....	.03	8.10
28 gals. molasses.....	.13	3.64
Fuel—		
00 gals. oil.....		
00 tons hard coke.....		
1½ tons gas coke.....	5.00	6.25
12½ tons hard coal.....	7.00	87.50
64 bush charcoal kindling.....	.15	9.60
00 bush wood kindling.....		
Total.....		\$245.09

SECTION VIII.

Figure all wages paid during month in foundry as follows:

Wages paid in January, 1906, in foundry:

Foreman.....	\$115.50
Assistant foreman.....	59.92
Molders.....	950.70
Core makers.....	652.42
Furnace tenders.....	180.10
Laborers.....	405.25
Casting rappers.....	103.45
Casting cutters.....	105.67
Casting grinders.....	143.49
Crusher tender.....	38.10
Total.....	\$2,754.60

SECTION IX.

Determine castings produced, ready for machining, during month, entering each lot as it leaves foundry, as follows:

Castings produced in January, 1906, in foundry (ready for machining):

Date.	Yellow Pounds.	Red Pounds.	Aluminum, phosphor bronze, white metal, Pounds.
5.....	1,411		
6.....	1,064		
9.....	3,423		
11.....	6,587		
12.....	6,506		
13.....	7,106		
15.....	3,658		
16.....	3,718		
18.....	3,372		
19.....	3,538		
20.....	3,974		
22.....	4,234		
23.....	6,862		
25.....	3,084		
26.....	3,881		
27.....	4,191		
29.....	5,167		
30.....	3,258		
31.....	7,726		
Totals.....	82,760		

Summary.
Red.....
Yellow.....
Aluminum, phosphor, bronze, white metal, &c.....

Grand total (D)..... 82,760

Find percentage of total defective and spoiled castings in Section V on above grand total of castings produced, as follows:

Red castings, defective.....	Pounds.
Yellow castings, defective.....	935
Red castings, spoiled.....	
Yellow castings, spoiled.....	2,806
Total.....	3,741

Equals 4½ per cent. on total output for January (82,760 lbs.).

SECTION X.

Summarize previous results as follows:

Summary for January, 1906, in foundry:

Section.	Pounds.	Value.
I Inventory metals.....	27,678	\$3,785.96
II Inventory supplies.....		255.55
III Metals purchased.....	53,326	7 525.69
IV Supplies purchased.....		437.90
V Metals returned.....	25,940	3,110.16
VI Wages paid.....		2,754.60

(A) Totals..... 106,944 \$17,869.86

Deduct inventory of metals first of following month, Section VI..... 18,244 \$2,433.04

Deduct inventory of supplies first of following month, Section VII..... 245.09

(B) Totals..... 18,244 \$2,678.13

(C) Total amounts used (deduct B from A)..... 88,700 \$15,191.73

Castings produced (D), Section IX..... 82,760

Loss (deduct D from C)..... 5,940

Produced 82,760 lb. castings (D) at a cost of \$15,191.73

(C) equals 18.4 cents per pound.

SECTION XI.

As certain Total Expense for past year which must include all of the following, but not *Selling Expense* and *Out Freight*:

General—	
Officers' salaries.	Electric light.
Rent or interest in investment.	Gas light.
Fire insurance.	Telephone.
Liability insurance.	Telegrams.
Boiler insurance.	Mercantile agency.
Personal taxes.	City directory.
Real estate taxes.	Toilet paper.
Depreciation.	Clock dials.
Building repairs.	Traveling (outside of agents).
Machinery and equipment repairs.	Association.
Bad accounts.	Attorney.
Interest.	Patents.
Discount.	Advertising.
In freight.	Entertaining.
Cartage.	Contributions.
City water.	Charity.

POWER AND TRANSMISSION.

Steam coal.	Engine packing.
Kindling wood.	Belting replaced.
Cylinder oil.	Pulleys replaced.
Machinery oil.	Belt lacing.
Cotton waste and wiping rags.	Belt dressing.

FINISHING DEPARTMENT.

Emery wheels.	Miscellaneous tools.
Files.	Shop boxes.
File handles.	Shop boards.
Taps.	Brooms.
Dies.	Emery cloth.
Drills.	

FOUNDRY.

Molding sand.	Riddles.
Core sand.	Mallets.
Fire brick.	Brushes.
Fire clay.	Emery wheels.
Shovels.	

POLISHING AND PLATING.

Cutting down composition.	Glue.
Coloring composition.	Glue brushes.
Hard buffs.	Leather for wheels.
Soft buffs.	Pumice stone.
Emery.	Nickel anodes.
Straps.	Nickel salts.
Felt wheels.	Lye.
Canvas wheels.	Cyanide potash.
Leather wheels.	Nickel scouring brushes.
Wood wheels.	Copper wire.
Paper wheels.	Whiting.
Solid emery wheels.	

OFFICE.

Stationery.	Circulars.
Letter heads.	Catalogues.

SECTION XII.

Deduct from your Total Expense, for past year, if included with same, the following foundry items, which are directly figured in cost of castings in Sections II and IV:

Oil.	Dextrine.
Hard coke.	Glue.
Gas coke.	Lycopodium.
Hard coal.	Partamol.
Charcoal kindling.	Core wire.
Wood kindling.	Rosin.
Crucibles.	Molasses.
Flour.	Phosphorus.
Core compounds.	Facing.
Core oil.	
Total for Section XII.....	\$18,358.98
"B"—Total for Section XII.....	\$
Place your result in line "B."	

SECTION XIII.

Determine wages paid during past year for nonproductive labor, which includes following:

NONPRODUCTIVE LABOR.

Bookkeepers.	Tool makers, on repairs.
Stenographers.	Pattern makers, on repairs.
Office clerks.	Machinists, on repairs.
Office boy.	Millwrights, on repairs.
Timekeeper.	Engineer.
Draftsman.	Fireman.
Superintendent.	Oiler.
Shipping clerk.	Porter.
Packing clerks.	Watchman.
Foreman (except foundry).	
Total for Section XIII.....	\$18,358.98
"B"—Total for Section XIII.....	\$
Place your result in line "B."	

SECTION XIV.

Determine productive labor, paid during the past year, for Finishing and Polishing departments, as follows:

Total labor paid during past year.....	
Deduct total foundry labor paid during past year (Section VIII).....	
Deduct total foundry labor paid during past year (Section XII).....	
Leaves productive labor during past year for Finishing and Polishing departments.....	
Determine amount to be added to productive labor in Finishing and Polishing departments, as follows:	
Total expense (Section XI).....	
Nonproductive labor (Section XIII).....	

Add to productive labor to make up expense and non-productive labor.....
Figure percentage of total addition (Section XIV). \$.....
to productive labor, \$....., which equals %.

SECTION XV.

Itemized Weights and Labor as follows:

— No. 4½ N. P. Fuller Double Bath Cocks with Rough L. P. Couplings.

	Rough weight.	Finished weight.	Hand finishing.	Assembling.	Testing.	Polishing.	Buffing.	Coloring.	Nickel plating.	Nickel buffing.
Bodies.....										
Cups.....										
Sprouts.....										
Nozzle nuts.....										
Nozzle tails.....										
Handles.....										
Eccentrics.....										
Caps.....										
Stems.....										
Shank nuts.....										
Shanks.....										
Flanges.....										
Lock nuts.....										
Coupling nuts.....										
Coupling tails.....										
Totals.....										

Bills and statement heads.	Discount sheets.
Stamped envelopes.	Wood cuts.
Postal cards.	Electrotypes.
Postage.	Indexes and transfer cases.
Bookkeepers' books.	Pay envelopes.
Timekeepers' books.	Pens, pencils, ink, &c.
Copying books.	Rubber stamps.
Index cards.	Typewriter supplies.

SHIPPING AND PACKING.

Shipping cases and barrels.	Wrapping twine.
Shipping tags.	Excelsior, straw, &c.
Shipping books.	Nails.
Paper boxes.	Marking paste and brushes.
Labels.	Stencils and stencil inks.
Wrapping paper.	Cloth for wiping.
Total for Section XI.....	\$45,886.38
"A"—Total for Section XI.....	\$
Place your result in line "A."	

SECTION XVI.

Deduct finished weight total, lb., from rough weight total, lb., in Section XV, to determine borings made, which equals lb.

SECTION XVII.

Determine cost of materials used, outside of castings, as follows:

Handle screws.....	\$
Rubber balls.....	
Ball caps.....	
Ball cap nuts.....	
Lead washers.....	
Shank washers.....	
Wick packings.....	
Total.....	\$

SECTION XVIII.

Determine productive labor for finishing and polishing figured in Section XV, as follows:

Machining	\$.....
Hand finishing .....	.....
Assembling .....	.....
Testing .....	.....
Polishing .....	.....
Buffing .....	.....
Coloring .....	.....
Nickel plating .....	.....
Nickel buffing .....	.....
Total	\$.....

SECTION XIX.

Summarize cost of finished No. 4½ bath cock, as follows:

Castings, rough, weight	lb. (Section XV) at	cost per lb. (Section X)
Materials (Section XVII) .....	.....	.....
Productive labor (Section XVIII) .....	.....	.....
Total material and labor .....	.....	\$.....
..... Per cent. bad castings on	lb. (Section IX) .....	.....
..... Per cent. expense (Section XIV.) on productive labor .....	.....	.....
Total addition .....	.....	\$.....
Grand total .....	.....	.....
Deduct borings (Section XVI),	lb. at	\$.....
Net cost F. O. B. factory .....	.....	.....

The percentage of expense as shown in Section XIV being based on, say, an output of \$300,000 per year, can be used only as a basis of figuring cost when the output is approximately this amount, for it is well to bear in mind that in case of a less amount of output the general expense remains nearly the same, consequently a larger percentage than the one given in Section X must be taken in order to cover the entire overhead expense. To illustrate this proposition we assume that a factory being equipped and is producing under ordinary conditions 100,000 worth of goods per year, does find this amount reduced to \$240,000, or 20 per cent. less than the normal. We find in looking over the various items of expense enumerated in Section XI that but a comparatively small reduction in these amounts is possible, except in actual productive labor, which, of course, is regulated by the amount of work on hand.

The items of expense subject to reduction are as follows (approximately):

Liability ins.	\$.....
Discount .....	.....
In freight .....	.....
Cartage .....	.....
Coal .....	.....
Foundry supplies .....	.....
Pol. and plating supplies .....	.....
Shipping and packing .....	.....

Taking this amount as a basis, we then find the following result:

Foundry labor .....	.....
Less	per cent.
Productive labor .....	.....
Less	per cent.
Nonproductive labor .....	.....
Total labor paid .....	.....
Foundry labor .....	.....
Nonproductive labor .....	.....
Net producing labor .....	.....
Total expense .....	.....
Less reductions .....	.....

Total expense representing

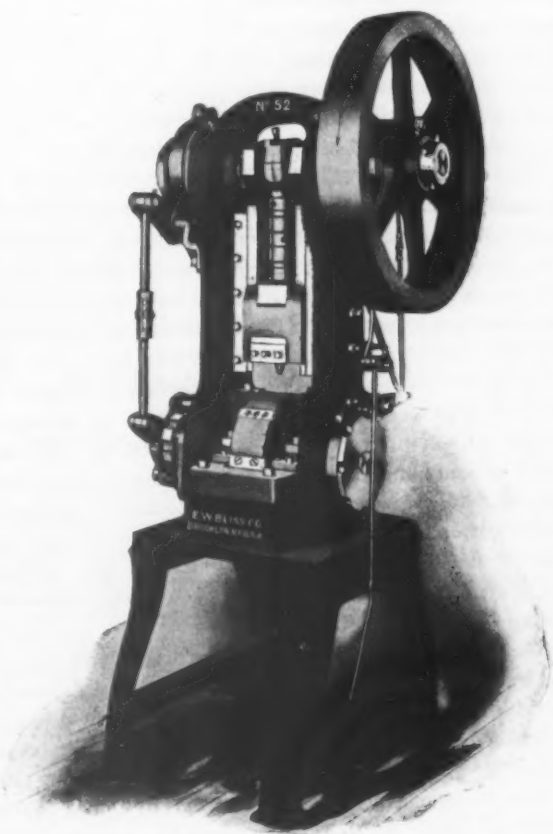
It is not the intention to have these figures accepted as actually correct, but only as a means of demonstrating the great increase of percentage of cost at such times as a factory is not running up to its full capacity.

The Fischer Foundry & Machine Company, with works at Ford City, Pa., and offices in the Empire Building, Pittsburgh, Pa., has materially increased its facilities for making steel castings and is soliciting trade in this line, being prepared to furnish castings to any specifications. The company makes a specialty of small steel castings where requirements are exacting. A chemical laboratory has been installed in connection with the foundry practice, and both steel and iron castings are made from mixtures determined by chemical analysis. In addition to steel castings the company makes iron and bronze castings and machine molded gears of either of the above materials. A complete line of rolling mill machinery is also manufactured.

A Special Bliss Power Press.

A large part of the work of a press builder is the designing and making of presses for special purposes, for reducing the handling and thereby the cost of articles made in large quantities. This not only includes anything made of sheet metal, but also for fastening a sheet metal part to one of some other material, as, for instance, the fastening of paper labels on ointment boxes, porcelain liners in Mason jar tops, handles of brushes in metal bands for holding in the bristles and for feeding and fastening cork liners in tin bottle caps. For all of these purposes and many others special machines have been designed. Herewith is illustrated a press which has been designed for fastening the pins in the heads of upholsterers' tacks.

In this press the dies are fastened to a horizontal dial feed, which is operated by a cam on the main shaft, and the work is quickly and accurately done without any danger to the hands of the operator, who has no occasion to put his fingers near the punch. The press is also



A Special Power Press Built by the E. W. Bliss Company, Brooklyn, N. Y.

equipped with a cam actuated knockout, for removing the piece, a chute feed (not shown), and a safety clutch, which prevents the slide from coming out until the dial is in its correct position. The chute feed is used for feeding the heads of the tacks which have been formed in a previous operation. The press will fasten the heads in the pins at a rate of about 70 per minute. As the tack leaves the press it is finished. The total weight of the machine, as shown, is about 3700 lb. It was built by the E. W. Bliss Company, Brooklyn, N. Y.

The Duplex Metals Company, 208 Fifth avenue, New York, which some months ago purchased the plant of the Combination Steel Company at Chester, Pa., fitting it up for the manufacture of Monnot metals in plates, sheets and wire of copper-steel, announces that the wire department is now in operation and it is ready to fill orders for this product. The wire, which is of steel and copper, has a tensile strength greatly exceeding that of hard drawn copper or any special alloy commonly used to make wire for electrical purposes. J. F. Monnot is president and Byron E. Eldred secretary and treasurer.

THE IRON AGE

1855-1906.

New York, Thursday, September 27, 1906.

DAVID WILLIAMS COMPANY,	- - - - -	PUBLISHER
CHARLES KIRCHHOFF,	- - - - -	EDITORS
GEORGE W. COPE,	- - - - -	
A. I. FINDLEY,	- - - - -	
RICHARD R. WILLIAMS,	- - - - -	HARDWARE EDITOR

Foundry Betterment Through the Strike.

A statement on behalf of the officers of the National Founders' Association shows 114 foundries heretofore operated under union conditions that have been put on the "open shop" list since the molders' strike of April and May. The number of molders who went out is estimated at 7000. The number who have since returned to work under various settlements is not given. It is stated that more than 3000 new men have been instructed in molding and that many of them have become very proficient; also that over 1000 molding machines have been successfully introduced on work which, previous to the strike, had only been done by skilled molders.

The state of war that has existed in the foundry industry in various parts of the country in the past five months is deplorable in many of its aspects. What General Sherman said of civil war or of war between nations has an application also to strife between manufacturers and their employees. Strikes are destructive of wealth, both of capitalist and wage-earner, too often also destructive of life, and akin to the warfare of armies in awakening in the combatants the urgings of elemental savagery. Civilization may be advanced by the barbarity of war, and economic progress may be made over the rough road of the strike and the lockout. The molders' strike and all its attendant bitterness and waste are not the line of advance that would have been chosen; but that an important advance has been made the figures quoted are decisive evidence.

So far as the Iron Molders' Union has sought to limit the number of apprentices in foundries or to determine by committee how much work shall be done in a day or to enforce the rule that molding machines shall be operated by journeymen molders, it has been attempting to free its members from the operation of forces against which no power on earth can insure the business of an employer. He must meet the competition of founders who may have found ways of making twice as many castings with the same outlay for labor. There is no general law that prescribes that a foundry shall shut down for the day when a certain output has been reached. Yet the logical outcome of apprentice restrictions, of solemn committee sessions to decide how many castings a day may be made from a new pattern or what the piece price shall be, and of the claim that machines built to be operated by unskilled men shall be put in charge of high-priced men, would be the enactment of a law requiring foundries engaged on the same class of work to conform to uniform practices as to output and wages. It matters not that employers often enter into agreements with their workmen engaging to do or to permit these very things. Neither employers nor employees nor both together can set aside laws that antedate corporations and trade unions and that will continue to exist even though both should disappear. There is no law to prevent another man from exceeding to-morrow the record made to-day by the fastest and best skilled artisan in any craft. There is none to prevent the perfecting next year of a

machine that shall turn out twice as many articles as the best machine known to the present state of the art.

The foundrymen who have introduced the more than 1000 molding machines that now co-operate with unskilled men in doing work that a few months ago was confined to skilled molders have been forced into the new way by the exigencies of the strike. With their shops full of work at profitable prices they would not voluntarily have turned aside to any such experiment. Peace might have been secured in many cases by compromise, but the foundry industry would then have lost the great economic advance that has come from the unhappy conflict of recent months. Some of the advantage gained in lowering the unit of cost (an entirely different thing from lowering wages) may have to be surrendered in some cases. All the open shops may not retain permanently the status of to-day. But the foundry industry as a whole is now on higher economic ground than it was in April, and it is scarcely conceivable that it will ever return to the conditions that preceded the strike of 1906.

In the Homestead strike of 1892 the Amalgamated Association contended for the economically unsound proposition that a sliding wage scale, based on the market price of billets, should cease to slide downward when a certain price for billets was reached, no matter how far below that price the market might go. It also insisted that no matter what improved machinery a steel manufacturer might introduce, adding to the output of a mill without increasing the exertions of the tonnage men, the tonnage rate should not be changed. Both these contentions contradict basic economic facts. For employers to agree to them would not have made them a whit less fallacious and unsound. To-day they are no longer on the list of steel works labor problems. A similar disposition is promised of some of the issues over which molders and foundry proprietors are at war.

An Increasing Use of Scrap.

The iron and steel statistics prepared by the Bureau of the Census are not especially interesting to the iron trade because the figures gathered by the American Iron and Steel Association are given to the public so much sooner, with a clearer and more familiar classification, and are presented annually. The Census Bureau, however, gives information on one very interesting subject which is not touched by the American Iron and Steel Association, and that is the consumption of scrap.

The Census reports that in 1900 the rolling mills and steel works consumed 4,113,287 gross tons of scrap, and in 1904 5,124,277 gross tons of scrap. The scrap consumed by iron foundries does not appear to be included. The rolling mills which used scrap would naturally include mills which reroll old rails into merchantable rails and into various merchant forms, such as bedstead angles, reinforcing bars for concrete, etc., and mills which produce commercial wrought iron by the puddling or boiling process, by scrapping and busheling, and by heating faggots and piles on boards. The steel plants which used scrap would include regular Bessemer and open-hearth steel works making rolled steel, also steel foundries.

The increase in scrap used in 1904 over the total for 1900 is 1,010,990 gross tons, or 24.6 per cent. In the same period pig iron production increased 19.6 per cent. The consumption of scrap in the four years, therefore, increased about one and one-fourth times as rapidly as the consumption of pig iron. This is particularly important because the year 1904 was not as good a year

for scrap outcome as was 1900. The range of values was lower, as is known from market conditions, while the Census Bureau shows an average value for the scrap reported of \$16.20 a ton in 1900 and of \$13.19 a ton in 1904, a decline of \$3.01, while its figures on pig iron showed a drop of but 39 cents, from \$14.50 to \$14.11 a ton. Then, too, there was a smaller proportion of rebuilding and improvement in 1904, leading to the scrapping of old equipment, so that altogether 1904 was an unfavorable year for the comparison, yet a good increase in scrap consumption was shown.

It is well understood in the trade that the future must place more and more dependence upon scrap as raw material. The increasing use of scrap and the making of better steel, by alloying and otherwise, so that where one ton is now required for a given purpose the future will require less than one ton, must be depended upon to mitigate the effects, not of the iron ore famine which has been predicted in some quarters, but of the steadily increasing market value of iron ore, of which the trade has had some experience already. It is gratifying, therefore, to find statistics which, under somewhat unfavorable conditions, show a clear increase in scrap consumption, not simply in tonnage, but relative to pig iron consumption also.

Steel manufacturers no doubt report to the Census as scrap used that tonnage which they originate themselves, and to this extent the figures are not indicative of the actual scrap outcome, but they follow the same principle when they report steel production for statistical purposes, since they report the weight of ingots cast, thus including the material which is immediately cropped and does not find a market as finished material, but goes back immediately to the open-hearth furnace or the converter. The most liberal estimates of the scrap which passes through the hands of dealers in a given year fall far short of the known requirements of the iron mills and the basic open-hearth steel works. The production of forge pig, although a part of it goes to iron foundries, particularly pipe works, is but a small fraction of the production of rolled iron, while the production of basic pig has averaged less than half the production of basic open-hearth steel. The difference, without adding anything for the consumption by acid steel manufacturers and iron foundries, is far in excess of the scrap passing in the open market. Allowing liberally for the sale of scrap directly by producer to consumer, and the various exchange arrangements by which producers of iron and steel receive scrap from their customers, the total which can be accounted for completely fails to measure up to the known consumption.

Nevertheless, the census figures indicate that the consumption of scrap is still greater than would be assumed from the data heretofore available. Thus, in 1904, the production of forge pig was 550,836 gross tons and of basic pig 2,483,104 tons, while the census reports the scrap consumption at 5,124,277 tons, making a total of 8,158,217 tons. Dropping even half the forge pig, as going to iron foundries, would still leave the total at almost 8,000,000 tons. In 1904, however, the production of basic open-hearth steel ingots and castings was 5,106,367 gross tons, and of rolled iron 1,760,084 gross tons, a total of 6,866,451 gross tons, leaving more than a million tons of material for the acid open-hearth industry, which made only 801,799 tons of ingots and castings in 1904, and for the Bessemer converters. Through the use of ore the basic open-hearth steel industry makes more steel than the pig and scrap consumed, and there is some gain in puddling from the same source. Evi-

dently the Bessemer converter still uses considerable scrap, although the proportion has been cut down in recent years in plants where basic open-hearth furnaces are handy.

In this year 1904, which shows a large increase in scrap consumption, the proportion of basic pig iron to basic steel was larger than in preceding years, since the total basic pig production reported was 48.6 per cent. of the total basic open hearth steel. In 1903 basic pig iron was only 43 per cent.; in 1902, 45.2 per cent.; in 1901, 40 per cent., and in 1900, 42.1 per cent. In 1897 and 1898, however, it exceeded 50 per cent.

In 1900 the scrap consumed equaled 29.8 per cent. of the pig iron produced; in 1904 the percentage was 31.1 per cent. The supplementing of pig iron by scrap will undoubtedly increase and may reach one-half within a few years. It is true that some of this scrap is new material, but this is a discussion of statistics, and the statistics of steel production which the trade has include that new material when it has gone through the ingot form.

It was remarked before that the increasing value of iron ore requires more dependence to be placed upon scrap and upon the making of better steel—steel of which a ton will go further. It cannot be said yet that the scrap used is made into better steel than it was, but it is not improbable that within the lifetime of the present generation scrap will be made into steel of which a given number of tons will perform a much greater service than the same number of tons of the quality which that scrap possessed in its day.

Importations of Machine Tools Unlikely.

The suggestion is heard that it may be necessary to import European machine tools because of the enormous demand for this class of machinery. The idea is quite natural under existing conditions, when certain classes of tools are practically out of the market and when prices are so high that the duty on imported tools would not bring the price of foreign built machines much, if any, above the American price. It is not known that any machine tool users have as yet taken steps toward actually buying abroad, and it is quite likely that they will go slowly in the matter.

It is presumed that European builders could furnish machine tools if they were called upon to do so; the demand abroad has not yet become so great that their facilities are overcrowded. But there is almost an entire lack of knowledge among most American users of machine tools as to the class of product which is built across the water. Standards over there are not the same as here. While many American tools have been copied or adapted and American methods accepted by foreign builders, yet there is still a great difference in machines, and from the very large foreign demand for American tools of late years, a demand which has revived rapidly the past twelvemonth, it is presumed that our tools are preferred in many instances to those of the home builders. This, however, is especially true of those classes of machinery which are most difficult to buy at present in America, such as milling machines, grinding machines and the various classes of automatics.

The American manufacturer who should mix his equipment by the installation of foreign-built machines would have difficulties to overcome not only in adapting them to his methods, but in maintaining them, for it would be no easy matter to procure repair parts, and in the beginning it would be a disadvantage to be so far from the home works in case everything did not at first

go smoothly, which happens not infrequently everywhere. If the time ever comes, through the abolition of the tariff on machinery or otherwise, that foreign machinery builders will maintain regular agencies in this country their machines may become factors in our market. But to-day the manufacturer who purchases foreign machines would probably have to do his business directly with the European manufacturer and not through the agency of a dealer in this country who would carry repair parts and be equipped to attend to the original installation of the tools. It is doubtful if any American machinery dealer would care to go abroad for agencies and put in lines of machines which would compete with those of his American makes, for his market would be only temporary at the least. Altogether it will probably strike the user of machine tools who, because of inability to procure early deliveries of much needed machines, looks abroad for the solution of his problem, that under the circumstances he would be as well off and probably better off to place his order immediately in this country and take his turn in procuring here what he needs.

Crop Promise and the Iron Market.

One of the most obvious differences between the iron market of recent weeks and that of three or four months ago is that no explanations are required for any phase of the present situation. No room for divergent opinions exists. Those who thought they saw the beginnings of a reactionary movement in the late spring months were continually suggesting features of the market that seemed to bear out their claims. When the \$13 sales of Southern iron were announced in the second half of June, and when steel bars were being sold by one interest at \$1 to \$2 a ton below the 1.50c., Pittsburgh, basis, the prophets of a drift toward less prosperous conditions felt vindicated. But the single week of heavy sales of low-priced pig iron was in reality the culmination of the period of uncertainty. Each week in the following month contributed some proof that a new movement was under way, and for two months iron market reports have rung the changes on a note of prosperity unparalleled in volume and intensity. Perhaps no equal period has given so marked a demonstration of the effect exerted upon the iron market by cumulative assurance of splendid crops. The record yield of the ground promised for 1906 has more than counteracted for the time being all the apprehensions due to politics, speculation, the Russian upheaval, inelastic currency and lack of confidence in some custodians of the people's money. At the opening of 1906 it seemed scarcely possible that the new year would bring prosperity equal to that of 1905. The night seemed too dizzy to be maintained. Already it is plain that the phenomenal record of last year will be exceeded.

An Agreement in the British Tube Trade.—The agreement recently entered into by the manufacturers of wrought pipe and tubes in Great Britain includes the production of gas, water and steam tubes and fittings, but does not apply to boiler tubes except for export. The previous agreement in the tube trade was dissolved about 18 months ago, but was revived in May, 1906. There was so much cutting of prices in the export trade, however, that recently efforts were made, which have just now been successfully concluded, to frame an agreement taking in foreign shipments. It has been stated that American and German manufacturers are co-operating with the newly formed association, but this does not appear to be correct. The association has made an advance in the price of tubes by reducing the gross discounts 2½ per cent. It is probable that another advance will follow shortly.

CORRESPONDENCE.

The Cleaning of Blast Furnace Gas.

To the Editor: From the communication of C. A. Meissner of September 17, on the results attained with the Gayley dry air blast process at Isabella furnaces, I note that in alluding to its efficiency I have stirred up a delicate matter, which has been for a long time, and is still, the subject of heated controversy between engineers in this country and abroad.

While the additional information furnished by Mr. Meissner shows a higher gain at Isabella in power than was assumed, I feel unable to generalize this conclusion as to the reduction in cost of production, or to extend it beyond the particular case in question. To prove this statement, I would have to enroll almost the entire discussion referred to above, and which impresses upon the impartial observer the conviction that the adoption of the Gayley dry blast process has not met with anything like universal sanction, and that as far as its scientific explanation and confirmation, and its economic effects are concerned, it certainly stands on a disputable basis.

However, as the question of valuation of the dry air blast as an efficient means for reducing the cost of pig iron production has no direct bearing on the cleaning of blast furnace gas, it may suffice to refer engineers who are desirous to clarify their views regarding the merits of the Gayley process to a series of articles lately contributed to *Stahl und Eisen* by Prof. Bernhard Osann, which represent the latest thought on the subject and are advanced by an authority whose judgment must certainly be regarded as competent and free from conditional side interests.

F. E. JUNG.

NEW YORK, September 24, 1906.

British Open Hearth Steel Production in 1906.

The total output of open hearth steel in Great Britain in the first six months of 1906, as ascertained by the British Iron Trade Association, was 2,196,853 gross tons, against 1,980,095 tons in the first half of 1905, and 1,670,129 tons in the first half of 1904. The increase over 1904 is 526,724 tons, or at the rate of 1,053,448 tons a year. The Northeast Coast was the leading producing district, its output being 675,409 tons, while that of Scotland, which has fallen from first to second place, was 652,854 tons. Wales, the third district in point of output, produced 436,877 tons, and the Sheffield and Leeds District 172,896 tons.

The output of acid open hearth steel in the first half of 1906 was 1,638,667 tons, against 1,627,698 tons in the first half of 1905, and 1,326,882 tons in the first half of 1904. The total of basic steel was 558,186 tons, an advance of 205,789 tons over the basic steel record in the first half of 1905. The average output of ingots per open hearth furnace in operation was 5,828 tons for the half year, or at the rate of 11,656 tons a year. The total number of open hearth furnaces in operation in the six months was 375.

Of the leading forms of finished material rolled from open hearth steel the totals for the first half of the year were as follows: Plates and angles, 942,751 tons; bars, including tin plate bars, 493,981 tons. Of material marketed in semifinished form the total was 323,547 tons. The output of open hearth steel rails is increasing in Great Britain, the total for the first six months of this year being 52,458 tons, or considerably more than in any previous half year. One railroad produced 16,764 tons and a leading steel works on the Northeast Coast 16,551 tons.

The Standard Scale & Supply Company, Philadelphia, is building for the Pennsylvania Steel Company, Steelton, Pa., two scales claimed to be the largest ever built east of the Mississippi River, having a capacity of 150 tons. They are each 46 ft. long, and are built of structural shapes. The scales will be used for weighing shipments by the company.

Canadian Manufacturers and the Tariff.

TORONTO, September 22, 1906.—The Canadian manufacturers' Association has just concluded its annual meeting at Winnipeg and is now making its tour of the West, taking in every important town on the main line of railroad to the Pacific Coast. The trip will be leisurely enough to enable the members to enjoy the natural attractions at the various points of interest and to make a survey of the market. When they return from it they are expected to have learned some lessons that will be of service in the competition they are carrying on with American sellers in the western provinces. A feeling that they must become more energetic in that competition if they are to hold their own in the expanding new country doubtless decided both the choice of Winnipeg for the meeting place and the tour to the coast. That they count on something more than their own aggressiveness to give them the advantage there is manifest from the opening address of President Ballantyne and from the resolution and speeches on the subject of national trade policy.

Protection Expected.

The following extracts from President Ballantyne's address struck a chord to which there was a very general response:

It is for us to say whether we will continue to purchase our manufactured goods in the United States or put just a little more tariff on certain lines and make the factories in the States build plants in Winnipeg, Saskatoon, Moose Jaw, Calgary, Medicine Hat, Regina, Edmonton or any other of the many centers in our great western prairies which have advantages to offer, and by this means keep the population we are getting. Last year our dutiable imports from the United States amounted to \$94,200,167, the large percentage of which was manufactured goods and might just as well have been made in Canada. As it is, the United States farmers, workmen, manufacturers and other citizens have just that much of our money that should have been kept at home.

British Preference.

Mr. Ballantyne's explanation of the association's stand on the subject of a preference to Britain amounts to this—that the preference must not be detrimental to any Canadian interest. Speaking on this point he said, in part:

The true preferential policy has been aptly expressed by two little stamps, one of which bears the words, "Keep your money in circulation at home by buying goods made in Canada," while the other says, "When you can't get what you want at home buy within the British Empire."

We are sometimes asked what we mean when we say Canadian manufacturers do not demand a prohibitive tariff against the United Kingdom, but that we must at least have sufficient protection to put our Canadian manufacturers on an equivalent footing with those of Great Britain. Perhaps our meaning may be better understood when I cite the case of one of the members of our association who had large factories in Montreal and London, England. The difference in the wages paid in these two great factories of England and Canada is remarkable. Figures taken from the payrolls, and strictly accurate, show that common labor is 82 per cent. higher in Canada than in England, gang leader or subforeman 70 per cent. higher, boys (16 to 18) 85 per cent. higher, machinists 64 per cent. higher, carpenters 40 per cent. higher, girls (by the hour) 33 1-3 per cent. higher, and girls (piece work) 66 2-3 per cent. higher.

Are not these figures alone sufficient to show the necessity of maintaining an equalizing tariff against British goods?

Declare for Protection.

The report of the Tariff Committee, containing a reaffirmation of the principle of protection, was adopted. The following passage from the report fairly well summarizes its contents:

In spite of objections to a more protective tariff presented to the commission, the preponderating feeling throughout our country among all classes undoubtedly is that Canada should encourage its industries more effectively than it has done in the past. This feeling is largely the result of the campaign of education which has been persistently carried on since the Halifax convention of the association in 1902, and also by the logic of events, as during the last few years conditions have greatly changed in the United States, and Canadians have found it at times impossible to compete against the enormous surplus output of its great organization.

In short, the association's Halifax resolution of 1902 was readopted. Two details of that resolution are a demand that all supplies for the International and National Transcontinental railroads be subject to duties when imported, and that a bonus be granted for the encouragement of steel shipbuilding.

A Tariff Forecast.

Something like a forecast of the coming tariff is given by the Ottawa correspondent of the Toronto *Globe*, the chief newspaper organ of the Dominion Government. He says:

The fact that the tariff will contain maximum and minimum schedules and a third schedule for preferential rates to British goods has already been announced. The flat preferential rate of 33 1-3 per cent. is to disappear, and while no one can at present predict how it will be replaced, the presumption seems reasonable that each class of imports will be considered with reference to domestic conditions and the possibility of increasing our trade with Great Britain. This is an object which every Canadian is anxious to promote. If the foreigner is supplying us with goods which we could easily procure from Britain, the necessary diversion into British channels can be brought about. In one case we might apply the maximum tariff and in the other levy a rate which would insure competition in the Canadian markets. The minimum tariff, of course, could be extended to such countries as favored us with equivalent concessions.

An opinion hazarded from another quarter, supposed to be somewhat closely in touch with the Government, is that the antidumping duties will be dropped. On this subject the newspaper in question says:

"It has been discovered since the antidumping tax went into effect that its application was largely confined to importations of iron and steel from the States. If the maximum rates in the new tariff schedules are to apply against the United States these may be so framed as to achieve the same purpose that the antidumping clause had in view."

C. A. C. J.

The Labor Situation in Germany.

A press dispatch from Berlin, under date of September 22, says: The situation in the labor market, from the standpoint of the employee, has not been so favorable as at present since 1895. During the month of August, this year, according to figures prepared from returns received from the employment agencies under Government superintendence, the average number of men applicants for each 100 vacancies was 98, as against 105 for August, 1905. For each 100 places suitable for women there was an average last month of 71 applicants. Want of laborers is felt in agriculture, as well as in every other branch of industry. Only in one trade, that of butchering, is there an appreciable number of unemployed.

The financial pages of the press this morning are filled with reports of company meetings, especially of Rhenish and Westphalian steel and coal companies. In almost every instance the report of the year's business contains a reference to the scarcity of hands, and it is estimated that in coal mining alone 25,000 additional men could be employed.

The Congress on Testing Materials.—The Congress of the International Association for Testing Materials held at Brussels, Belgium, September 3 to 6, was attended by about 500 members representing 18 different countries. There was no delegate from the United States. The opening meeting was presided over by F. Berger, of Vienna. An address in memory of the deceased president of the society, Ludwig von Tetmayer, was delivered by Professor Schülle, of Zurich, Switzerland, and papers were read by Baron de Laveleye on "The History of the Belgian Iron Trade," and by Mr. Camerman on "The Belgian Cement Industry." The sessions were in three sections, dealing respectively with metals, cement and other materials. In the section on metals a spirited discussion took place on the value of tests with notched bars for ascertaining the relation between the different methods of testing and for fixing the numerical values representing the different properties of metals. The Brinell method for testing hardness was recommended. It was decided to appoint an international committee on reinforced concrete. A feature of the congress was a lecture by Professor H. Le Chatelier on "The Practical Value of Metallography." A visit was paid to the Cockerill Works, the managing director of which, A. Greiner, was chairman of the general Reception Committee. The next congress will be held in Copenhagen in 1908.

The Universal Portland Cement Company.

On October 1 the Universal Portland Cement Company, a new subsidiary company of the United States Steel Corporation, will take over the plants and business of the cement department of the Illinois Steel Company, Chicago, and will continue the manufacture of Universal Portland cement of the same high quality as heretofore. Edward M. Hagar, who has for six years been manager of the cement department of the Illinois Steel Company, will be president of the Universal Portland Cement Company, with headquarters in The Rookery, Chicago.

The present output of 6500 barrels a day of Universal Portland cement at South Chicago, Ill., and Buffington, Ind., is being increased by a new plant at Buffington, with a capacity of 6000 barrels a day, and a plant at Universal, Pa., near Pittsburgh, to have a capacity of 4500 barrels a day of Universal Portland cement. When the new plants are in operation in the summer of 1907 the total output of the Universal Portland Cement Company will be 17,000 barrels a day.

The cement manufactured in the new mills, as well as the old, will be made from slag and limestone by the same special process and under the same supervision that has been so successfully employed by the Illinois Steel Company since May, 1900. In the manufacture of Universal Portland cement the two raw materials, crushed limestone and chilled blast furnace slag, are first dried, then thoroughly ground together in proper proportions, and burned to a clinker in rotary kilns. This clinker is afterward finely ground and the resulting product is a true Portland cement, its method of manufacture, chemical composition and specific gravity being strictly in accordance with the definitions of the most prominent cement authorities in the United States and Europe.

True Portland cement made from slag should not be confused with Puzzolan or so-called "slag cements," which are simply mechanical mixtures of slag and slaked lime ground together without burning, the latter being suitable only for use under ground and in moist locations.

The remarkable increase in demand for Universal Portland cement, an evidence of its high quality, is shown by the following figures of production by years since it was first placed on the market:

	Barrels.		Barrels.
1900.....	32,443	1904.....	473,294
1901.....	164,316	1905.....	1,735,343
1902.....	318,710	1906 (estimated)...	2,200,000
1903.....	462,930		

The production of Universal Portland cement has shown a steadily increasing percentage of the production of the entire country, and in 1905 exceeded the production of the United States in 1896. When the new mills are in operation the output of the Universal Portland Cement Company will exceed 10 per cent. of that of the entire country.

Both the new plants will be driven entirely by electric power, from generators connected to gas engines using blast furnace gas. The power will be transmitted 10 miles to Buffington from South Chicago at 22,000 volts from two 2000-kw. generators located at the South Works of the Illinois Steel Company, from which point the supply of slag will be obtained. For the plant at Universal, Pa., near North Bessemer, the power will be transmitted 7 miles from two 2000-kw. gas engine generator units at the Carrie Furnaces, Homestead Works of the Carnegie Steel Company, which furnaces will also supply the slag. The cost of the two new plants will be \$3,000,000 and the equipment will be such as to make them modern and efficient in every way.

Contracts have been placed for 21 rotary kilns 7 ft. 6 in. in diameter and 120 ft. long, 47 tube mills, and for dryers, preliminary grinders, &c., with the Power Mining & Machinery Company, Cudahy, Wis., these orders being the largest ever placed at any one time for cement making machinery.

The buildings at each of these cement plants, consisting of raw material bins, dryer building, raw material mill, burner building, finishing mill, stock houses and miscellaneous buildings, such as machine shop, transformer station, office and laboratory, are being built en-

tirely of steel and concrete, the largest buildings being the stock houses, 600 ft. long and 100 ft. wide, giving a storage capacity at each plant of over 400,000 barrels of finished cement.

The constant use of Universal Portland cement for the last five years in all classes of cement work, such as sidewalks, floors, artificial stone, reinforced concrete, general engineering work, foundations, piers, dams, fire-proofing and general building construction, has given it a splendid reputation as a standard Portland cement of the highest quality.

E. H. Gary, chairman of the United States Steel Corporation; E. J. Buffington, president of the Illinois Steel Company; A. C. Dinkey, president of the Carnegie Steel Company; T. J. Hyman, secretary of the Illinois Steel Company, and Edward M. Hager are directors of the Universal Portland Cement Company.

Recent Customs Decisions.

The Duty on Charcoal.

The Board of United States General Appraisers took action last week which is likely to result in a material reduction in the duty on charcoal imported for use in blast furnaces. The test case came before the lower customs tribunal in the form of a protest filed by the Algoma Steel Company against the action of the collector of customs at Marquette, Mich., in assessing the company's importations at the rate of 35 per cent. under the provision in the tariff act for manufactures of wood.

It was insisted by the importer that the merchandise should be granted entry under the provision for unenumerated manufactured articles with duty at the rate of 20 per cent. This claim the board sustains, as was done in some earlier protests filed by the Algoma Company. The case just decided appears to have come before the tribunal owing to the continued contention of the Government that charcoal is a manufacture of wood. As the Government has lost again, and this time on a case carefully prepared for trial by the representatives of the Treasury Department, it is possible that Secretary Shaw will acquiesce in the latest finding of the board. Otherwise the issue will be carried into the Federal courts for adjudication. In sustaining the claim of the importers, General Appraiser Fischer says that since by the process to which the wood to produce charcoal is submitted every characteristic of the wood is eliminated, the board is of the decided opinion that charcoal is not, within the meaning of the present tariff law, a manufacture of wood.

Metal Cylinders for Penholders.

It has been decided by the Board of United States General Appraisers that small metal cylinders used for combination penholders are too complicated to be granted entry at 25 per cent. under the provision for penholders. The articles, which were imported by A. Strauss, New York, are closed at one end, while in the other is inserted another small cylinder, one end of which is fitted for holding a pen. The other end of the smaller cylinder contains a rubber eraser. The merchandise was assessed under the metal provision of the law at the rate of 45 per cent. This classification the board affirms.

Saxton Furnaces Sold.—The property of the Saxton Furnace Company, in the hands of trustees, was sold at public sale September 6, and the sale has been confirmed by the court. The property was located in two sections. A portion of it, including rolling mills, houses and adjoining lands, situated in Coatesville, Pa., was purchased by the Worth Brothers Company. The furnace property, ore and coal lands, situated on the Huntingdon & Broad Top Railroad, was purchased by Joseph E. Thropp. This portion of the property includes two blast furnaces, each 17 x 70 ft., 160 coke ovens, about 1200 acres of coal land, several thousand acres of ore and timber lands, limestone quarries, &c., all of which had formerly been operated by the Saxton Furnace Company. One of the furnaces is now being relined and will be put in operation before the close of the present year, with a capacity of 5000 to 6000 tons per month of foundry iron.

PERSONAL.

John O'Brien, Elwood, Ind., has been chosen superintendent of the Atlanta Tin Plate & Sheet Mill, Atlanta, Ind., to succeed Walter Jones, resigned.

Henry J. Hill, formerly master mechanic for the Electric Vehicle Company, Hartford, Conn., has been made superintendent of the Hendee Mfg. Company, Springfield, Mass., manufacturer of motor cycles.

A. J. Mason, a member of the firm of Hoover & Mason, contracting engineers, Chicago, has gone to Melbourne, Australia, his former home, for a three months' vacation.

Raphael H. Wolff of New York, the representative in this country of Dr. Héroult, the inventor of the electric steel process bearing his name, sailed for Europe last week. Probably Dr. Héroult will return with him.

Ferdinand Boecking of the Halbergerhütte, Saarbrücken, Germany, has returned home after a visit to American works.

James L. Sharkey has been appointed sales manager at the New York office of the General Fireproofing Company of Youngstown, Ohio, in the department of expanded metal, metal lath, twisted lug bars and girder frames.

F. G. Bolles, general manager of the International Specialty Company, New York, manufacturer of specialties from sheets and tin plates, has gone abroad in the interest of the company.

R. E. Mathot, Brussels, Belgium, the well-known gas expert and writer on gas engine and gas producer development, will visit the United States in November, making his headquarters at the house of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York.

R. J. Mansfield, for some time connected with the Wellman-Seaver-Morgan Company, Cleveland, Ohio, is now a member of the staff of the Atlantic, Gulf & Pacific Company, New York. He will sail from San Francisco this month, and will be engaged for some time on work for the above company at Manila, P. I., later making a tour of Europe.

John McCaslin, formerly of the Union Rolling Mill Company, Cleveland, Ohio, has been made superintendent of the Shenango Iron & Steel Company's mill at Wheatland, Pa., succeeding William S. Roberts.

Julian Kennedy, the well-known mechanical engineer of Pittsburgh, has returned from Europe.

A. M. Young, who returned to this country from England in March last, after resigning his position as manager of the blast furnaces of Bolckow, Vaughan & Co., Limited, Middlesbrough, England, is now secretary and treasurer of the Brighton Brass & Bronze Company, New Brighton, Pa.

George W. Fleming, who until recently was with the Williamsport Supply Company, Williamsport, Pa., has been engaged by the Vandyck Churchill Company and is connected with its Pittsburgh branch in the Farmers' Bank Building.

Pre-Heaters and Electric Furnaces.—It is suggested by the *Electrochemical and Metallurgical Industry* that the combination of a gas or coal heated furnace for the first part of a melting or refining operation and of electric heating for the last part would give a high average efficiency and at the same time reduce the cost of each useful calory to the lowest point. It adds: "The new steel plant at Syracuse [the Halcomb Steel Company] using Dr. Héroult's process, employs the open hearth furnace for the first and easy part of the work, while the difficult, high temperature refining is effected by the Héroult electric furnace. The combined pre-heater, as a shaft furnace directly on top of an electric furnace, so that the two are really one metallurgical instrument, has not been yet proved publicly practical, at any rate commercial, although we have private information of several interesting attempts that are likely eventually to be successful. Most electric furnaces are used for opera-

tions only possible by electrical heating, as reduction of alumina, graphitizing articles and the manufacture of carborundum. When the practical solution of the 'pre-heater' is worked out it will open large vistas of successful electrometallurgical operations that are most alluring and wonderful."

OBITUARY.

JAMES A. BURDEN.

James A. Burden, president of the Burden Iron Company, Troy, N. Y., died September 23 at his residence in New York City, aged 73 years. He had been an invalid for a year or more and had recently returned from Europe, whither he had gone for his health. His death followed an operation to relieve an affliction of the stomach.

Mr. Burden was born in Troy, January 6, 1833. He was the son of Henry Burden, the inventor and the founder of the Burden Iron Company. He was graduated from the Rensselaer Polytechnic Institute and immediately after was made foreman in a department of the Burden Iron Works. From this post he advanced step by step until he became the head of the concern. He inherited much of his father's inventive genius and produced a number of inventions for making horseshoes. Patents for these were awarded to him. Among other inventions may be mentioned machinery for making blooms, for settling puddling furnaces, for an intermittent mechanical motion, and an electrical machine for separating magnetic ore from its gangue.

He was at one time president of the Hudson River Ore & Iron Company and of the Engineers' Club of this city. He was also a member of the Civil Engineers' Society, the Society of Mechanical Engineers, the Union League Club and the Union Club, as well as several foreign scientific bodies. He had four sons, three of whom are living, the eldest, James A. Burden, Jr., being vice-president of the Burden Iron Company.

BENJAMIN F. HETHERINGTON, president of the Hetherington & Berner Iron Works Company, Indianapolis, Ind., died September 15, aged 77 years. He was born at Carlisle, England, and was brought to this country when a boy. At the age of 19 he apprenticed himself to a machinist at Cincinnati and when the strike of 1852 began he removed to Indianapolis. He entered a foundry and in a few years was foreman for A. G. Searl, later becoming his partner. The panic of 1857 forced him out of business and he became an employee of the Indianapolis, Cincinnati & Louisville Railroad Company. After 10 years he erected a small machine shop and thereafter his career was marked by great success. Frederick A. Hetherington, the only son of Mr. Hetherington, and Carl Hetherington, his grandson, are identified with the business, which has grown to large proportions. When the company was incorporated Mr. Hetherington was elected president and held the office until his death.

PHILIP F. KOBBE, vice-president and treasurer of the Westinghouse Electric & Mfg. Company, Pittsburgh, died at his country place in Stockbridge, Mass., September 21. He was born in New York, October 24, 1842, and was educated in Germany. He served in the Civil War as a member of the Seventh Regiment. He was an employee of the United States Lighting Company when it was absorbed, in 1890, by the Westinghouse Company. He was also identified with the British and French Westinghouse companies. He leaves a widow and five children.

ISAAC S. CASE, president since its incorporation of the International Boiler Works Company, East Stroudsburg, Pa., died August 18 at his home in Tobyhanna, Pa.

The suit of several years' standing brought by D. A. Raiff and others at Coshocton, Ohio, against Ambrose Beard and the American Sheet & Tin Plate Company, a case growing out of the sale of the property of the Coshocton Rolling Mill Company, has been dismissed, the plaintiff to pay costs.

The Machinery and Supply Meetings.

DETROIT, MICH., September 26, 1906.—(By Telegraph.) After two days of almost continuous deliberation of members of the three machinery and supply associations, embracing the business of the entire country from both the manufacturing and selling standpoints, the way has been paved for a simultaneous meeting of these three organizations next spring. This is an object which has been sought ever since the formation of the last of the associations, and that the possibility of its attainment seems so certain is most gratifying to all concerned. The three associations are the American Supply and Machinery Manufacturers' Association, which includes all makers of railroad, mill and machinists' supplies throughout this country, and the two organizations marketing their product—namely, the National Supply and Machinery Dealers' Association and the Southern Supply and Machinery Dealers' Association.

The executive committees of the three associations met separately and jointly and unally announced that unless some unforeseen obstacle appears the three associations will meet at the same time and place for their annual meeting next spring. In fact, it has been suggested entirely in an unofficial way that there may be an addition to the general conclave by inviting the National Machine Tool Builders' Association also to hold one of its semiannual conventions at the same time. The latter is purely a suggestion on the part of certain members and has received no official consideration as yet.

The advantage of having all of these associations meet annually at the same time and place would be considerable, and without doubt would accomplish much in bringing about a more prompt, effectual and amicable adjustment of all matters affecting the interests of the members of the four bodies. The constitution of the National Dealers' Association provides that the annual meeting shall be held on the second Wednesday in May, and that of the American Manufacturers' Association states its annual meeting shall be held simultaneously with that of the Southern dealers. While President Riechman of the Southern dealers is heartily in favor of meeting simultaneously with the national dealers it will be necessary for him to obtain the consent of his association before a definite decision can be given. This he will endeavor to obtain within the next 30 days, and if he is as successful as there is every reason to believe the second Wednesday in May will become a red letter day in the machinery and supply trades. It will enable the manufacturers and dealers from all parts of the country to unite upon ways and means of bringing the products of the manufacturer to the consumer.

Throughout the meetings held here there has been a strong sentiment in favor of the general adoption of the resale price method of protecting both the dealer and manufacturer. This is in operation among the members of the National Dealers' Association and seems to be working with entire satisfaction. It is stated that it has proved more effective inasmuch as that it can more readily be enforced than the method of prohibiting the sale of goods by the manufacturer directly to the consumer, unless he invoices the sale through a recognized dealer in the locality wherein the sale is made. It is questions such as this that demand adjustment to a uniform basis, so that the manufacturer may conduct his business in a consistent manner and which make joint sessions of the three organizations desirable. It is such action that is predicted by the harmonious and united workings of the three associations whose objects are so closely identified and whose interests are so mutual.

Throughout the sessions of the Executive committees here those who have done so much to bring about the very cordial relations which exist among the kindred bodies are Samuel L. Mozer and F. D. Mitchell, president and secretary, respectively, of the Manufacturers' Association; E. E. Strong and A. T. Anderson, president and secretary, respectively, of the National Dealers' Association, and J. A. Riechman, president of the Southern Dealers' Association.

On Wednesday morning the special meeting of the National Supply and Machinery Dealers' Association will be opened. It is principally the members interested in the selling of machine tools who are concerned in this meeting. Its specific object is to adopt certain measures in anticipation of the meeting of the National Machine Tool Builders' Association, which occurs October 10, in New York. The dealers feel that there are a number of matters which might be adjusted to the benefit of the manufacturers as well as themselves, and that they will be properly and amicably arranged if presented by the dealers through their association at the coming meeting of the machine tool builders. These matters include such subjects as the definition of territories and protection of the dealers in their allotted districts, and the formulation of an arrangement whereby the dealer may share more liberally the advanced prices which the machine tool builder is obtaining for his product.

It is the contention of the dealer that while the increased cost of manufacturing has forced the manufacturer to raise his prices the increased cost of selling this product makes it necessary for the dealer to receive a more liberal percentage of the profits the manufacturer is reaping. It is earnestly hoped by the dealers that they will be enabled to formulate their claims so that the manufacturers cannot fail to recognize their justice. The machinery section of the association is strongly represented here, a member of every important house in the country being present.

Labor Notes.

The Youngstown Car Mfg. Company, Youngstown, Ohio, has signed the wage scale of the journeymen molders and coremakers, making four employers in the Youngstown District that have signed the scale, which calls for a minimum of \$3.30 per day for molders and \$3.05 for coremakers.

A movement has been started in the Pittsburgh District for an organization of all machinery trades, taking in the machinists, pattern makers, blacksmiths, boiler-makers and molders, for the sole purpose of bringing about, if possible, an eight-hour day in those trades in the Pittsburgh District. It is said that the organization, if effected, will have over 10,000 members, and will be known as the Machinery Trades Alliance of the Pittsburgh District.

In annual convention at Atlantic City, N. J., September 19, the Master Builders' National Association affirmed its former declarations for the open shop, denounced attempts of labor organizations to restrict American youth in learning trades and declared itself opposed to the proposed creation of a national association of builders to control employers in the building trades by copying the methods of trades unions.

Some concern has been expressed on behalf of the chain making industry of Staffordshire, England, because of the withdrawal of chain makers from that district by German manufacturers. Higher wages and favorable conditions of employment were offered. Through the introduction of these men it is expected the chain making industry will be developed in Germany along the lines followed in England. *London Engineering* suggests that an English firm might start chain works in Germany and enjoy the benefits of the demand there.

A patent has been granted at Washington to M. Manaberg, Frodingham, England, assignor to the Frodingham Iron & Steel Company, Limited, on a modification in blast furnace construction. In addition to the usual connection between the tuyeres and the blast main the inventor provides another line of tuyeres, which are located in the bosh walls of the furnace and connected to the blast main by a supplemental blast pipe. These additional tuyeres are so arranged as to direct the blast tangentially onto the bosh walls of the furnace.

NEWS OF THE WORKS.

Iron and Steel.

Owing to the rapid increase in its business in the manufacture of terne and black plate the current year the Standard Tin Plate Company, Canonsburg, Pa., has added one more hot mill to its present train, giving it a six-mill plant, equipped with a bar mill. The company has also increased its capacity in the manufacture of tin and terne plate and is operating its plant full capacity.

The Berger Mfg. Company, Canton, Ohio, has awarded contract to the Schleper Engineering Company, Pittsburgh, Pa., for making improvements at its plant to consist of five sheet furnaces, five pairs furnaces, two double annealing furnaces, one regenerative bar mill furnace and one bushelling furnace. There are also to be installed engines and four 250 hp. water tube boilers. The boilers and engines were formerly in use at the sheet mill at Waukesha, Wis. The entire Waukesha plant is to be dismantled and the equipment removed to the Canton works, included in which is a 28-in. bar mill. New squeezers will also be installed. There will be considerable piping needed, together with a 4000 hp. feed water heater.

The Federal Court at Wilmington, Del., has directed the receivers of the Diamond State Steel Company to sell the property and make return by December 1. It is expected that the new owners will place the plant in operation.

A movement is under way for the construction of a steel plant at Lynchburg, Va., at the head of which is J. H. Wynkoop, who has an office at 319 West Ninety-third street, New York.

At the annual meeting of the Tidewater Steel Company, Chester, Pa., held September 19, the following officers and directors were elected: Charles E. Stafford, president; Frank Dreizler, secretary and treasurer; E. R. Dick, J. H. Moody, Joseph Gilfillan, George McCall, Charles A. Porter, Charles F. Schoen, Frank Samuel and F. F. Hovey. President Stafford stated that it was likely that the steel plant would be placed in operation in a short time, considerable dissatisfaction at the long idleness having been expressed by some of the stockholders.

The Superior Steel Company, Pittsburgh, maker of cold rolled strip steel, is making some large additions to its plant at Carnegie, Pa. Some new annealing furnaces, two cold mills and a hot mill are being built, and work on two brick and steel buildings has been started. The new annealing furnaces will be contained in a steel and brick building 60 x 109 ft., and the cold mills in a building 80 x 200 ft. At present this company is rolling strip steel up to 10 in., but when the additions now under way are finished strips up to 16 in. will be rolled. The company has been considering the matter of building open hearth furnaces, but has given this up for the present.

No. 4 open hearth plant of the Carnegie Steel Company at Homestead, Pa., has been finished, the last of the 10 furnaces having been started last week. The company now has a complement of 60 50-ton open hearth furnaces at the Homestead works, all of which are in operation, the company turning out at the present time more than 6000 tons of open hearth steel every 24 hr.

The Refined Iron & Steel Company, Pittsburgh, has placed in operation its plant at Stoops Ferry, Pa., and will manufacture high grade iron for stay bolts, chains, engines, bolts and nuts, cold rivets, &c. This is a new plant and has just been completed. The officials are J. C. DeNoon, president; I. N. DeNoon, treasurer; Henry F. Glig, secretary, and William Stubblebine, general manager.

It is stated that the Crucible Steel Company of America will build two sheet mills, 200 x 290 ft., at its Sanderson Brothers Steel Works, Syracuse, N. Y., to be of structural steel and cost \$150,000.

The new furnace of the Federal Furnace Company, on the Calumet River, South Chicago, controlled by Pickands, Brown & Co. and associates, is nearing completion and will be blown in some time in November. The original plans for this plant contemplated the erection of two furnaces, and it is understood that the work will be begun on the second stack on completion of the first furnace.

General Machinery.

Beall Brothers, East Alton, Ill., manufacturers of miners' tools and supplies, contemplate the purchase of a 1500 lb. steam drop hammer. The company reports business very brisk.

The Seaboard Air Line is erecting a new planing mill at Savannah, Ga., to be equipped with modern tools, and is extending its freight car repair yards at that point to take care of the heavy increase in its business. Small buildings for the storage of paints and other materials are also to be put up.

The Pioneer Iron Works, Brooklyn, N. Y., whose plant was recently damaged by fire, has commenced work in the departments not damaged by the fire in order to finish contracts on hand. The portion of the plant that was burned will be rebuilt as soon as the insurance is adjusted. The engine and boiler were not damaged, but the company will need a few new tools.

The Locke Brothers Mfg. Company, Robinson, Ill., has erected a new plant consisting of a machine shop, 30 x 50 ft., and blacksmith shop, 30 x 60 ft., in which there will be in-

stalled three lathes, Cincinnati shaper, drill, grinder, compressor, Scully shears and punch, one set of rolls, steam hammer, welding machine and engines. The company was formerly located at Muncie, Ind., and does general machine, blacksmith and boiler work.

The H. E. Boucher Mfg. Company has been incorporated to take over the business of H. E. Boucher, 105 Maiden lane, New York. The company has an authorized capital of \$15,000, and will continue Mr. Boucher's business which was that of making inventors' models and turning out special work in the way of small mechanical contrivances and similar articles. The company expects to enlarge its plant, and probably a little later on will be in the market for some machine tools for that purpose. It is expected that the floor above the one it now occupies will be converted into a machine shop. The incorporators of the company are H. E. Boucher of New York and W. W. Hazelton and H. Packer of Washington, Del.

Mackintosh, Hemphill & Co., Pittsburgh, have placed a contract with the Eastern Steel Company, Pottsville, Pa., for the erection of a new steel building, 40 x 200 ft., two stories high, which will be used as a machine shop, pattern rooms, &c.

The R. S. Newbold & Son Company, Norristown, Pa., has recently received, among other orders, one for spacing tables for the McClintick-Marshall Construction Company and one for a large shear for the Lukens Iron & Steel Company.

The United Cement Machinery Mfg. Company has been organized under the laws of Maine with an authorized capital stock of \$1,000,000, and will operate under the patents of the Harmon S. Palmer Company, Washington, D. C.; the Winget Concrete Machine Company, Columbus, Ohio, and the Cement Machinery Mfg. Company, Burlington, Iowa. The headquarters of the company will be at Columbus, and the manufacturing plant will be located at Plain City, Ohio, about 18 miles from Columbus. The company will manufacture the machines now built by the three companies named above, and will also handle a full line of machinery for manufacturing cement block. The officers are: President, Harmon S. Palmer; first vice-president and treasurer, J. F. Angell; second vice-president and manager, J. W. Sanderson; secretary, J. M. McDowell, and general counsel, H. C. Black.

Power Plant Equipment.

The Buckeye Engine Company, Salem, Ohio, is making an addition to its plant of reinforced concrete construction, covering 1600 sq. ft., together with a one-story smith and forge shop, also of reinforced concrete. Orders for the tools and other equipment to be installed in these additions have been placed.

The Montreal Light, Heat & Power Company has recently contracted with the Canadian Westinghouse Company, Limited, for a large addition to its power equipment. The apparatus contracted for is for the new Soulanges Canal power station on the St. Lawrence River and consists of three Westinghouse 3750-kw. revolving field alternating current, two bearing generators connected to water turbines; two 150-kw. direct current 125-volt exciter units, and 2500-kw. oil insulated, water cooled transformers, to the number of 13.

The Westinghouse Machine Company, East Pittsburgh, has secured a contract to build turbines for the Philadelphia Rapid Transit Company, which calls for two Westinghouse-Parsons turbo-generating sets of 6000 kw. capacity each, for installation in the power plant of the new subway. The Plume & Atwood Mfg. Company, Thomastown, Conn., has ordered a 750-kw. turbine unit, and a 600-kw. outfit is to be put in the chemical manufacturing plant of Keasby & Matison, Ambler, Pa. The New York, New Haven & Hartford Railroad has ordered a 700-kw. equipment, which is to generate energy at one of its electric traction power stations. A 650-kw. turbo-generating vat is to be shipped the American Hard Rubber Company, College Point, Long Island, while an outfit of similar capacity has been contracted for by the Barnett Mfg. Company, Peoria, Ill. A 500-kw. vat will also be shipped the Sotany Worsted Mills, Passaic, N. J.

The Rust Boiler Company, German National Bank Building, Pittsburgh, Pa., has secured an order for the boilers for the new plant of the Indiana Steel Company at Gary, Ind., the order being for 6432 hp. Rust water tube boilers. The company had previously received two large orders for boilers from the Illinois Steel Company.

Foundries.

The Hecht Bros. Mfg. Company, Woodstock, Ill., recently incorporated with a capital stock of \$25,000, will open its new brass foundry in a few days, the work of packing the machinery for shipment from Aurora, Ill., where the plant was previously located, having already begun. The new factory building which will be occupied is a one-story brick structure, 32 x 72 ft. The new equipment purchased was bought from Walters & Berger, machinery dealers, Aurora, and is of the Fairbanks, Morse & Co. make. Interested in the company are James and Jerry Hecht and A. B. Terry. The company will manufacture brass, bronze and aluminum castings and special alloys.

The General Castings Company, Verona, Pa., which recently added another open hearth steel furnace, is making a large addition to its plant and is enlarging its crane service.

The establishment of a municipal iron foundry at Chicago is receiving the favorable consideration of Mayor Edward F. Dunne and other city officials. The idea has been proposed by a committee of labor union leaders, who have suggested that the city have its own iron foundry and place the employees under union rules. The foundry can be established adjoining the present municipal machine shops at Twenty-second street and Ashland avenue.

The Morton Iron Works, Brooklyn, N. Y., has under consideration the removal of its plant to some point in Pennsylvania, but no site has been selected.

Fires.

The plant of the Kennedy Valve Mfg. Company, at Cocksackie, N. Y., was damaged by fire last week.

The Nova Scotia Fertilizer Company's mill at Halifax, N. S., was destroyed by fire September 21.

The paint and color factory of the Wadsworth-Howland Company, Chicago, Ill., was damaged \$100,000 by fire September 22.

Hardware.

The Harry Brothers Company, Dallas, Texas, manufacturer of tanks and cisterns, is about to add a new feature to its business and has ordered machinery for the manufacture of galvanized iron, eaves trough, conductor pipe, well casing and kindred products. An addition to the present factory will be built to accommodate the new department, which will give employment to 25 or 30 additional men.

The Trussell Hay Harvesting Machinery Company, 108 Water street, Boston, has been organized to manufacture a new hay rake and cocker and a hay loader. The company will establish a shop, but it is not definitely decided where it will be located nor what equipment will be required. The officers are: President, Wilbert C. Trussell, the inventor of the machines, and treasurer, Lemuel R. Howe.

Colburn Machine Glass Company, Franklin, Pa., recently incorporated under the laws of the State of New Jersey, with a fully subscribed capital stock of \$500,000, intends to manufacture window glass by a continuous sheet drawing process, and also glass making machinery. It is stated that the machinery now owned by the company is protected in the United States by over 30 patents and also patented in 16 foreign countries. It is claimed that with the company's process perfect sheet glass, of any desired width and of a thickness varying at the will of the operator from single strength up to nearly $\frac{1}{4}$ in., can be drawn at a much lower cost than by any other existing process.

The Niagara Wire Cloth Company, Buffalo, N. Y., has been incorporated, with a capital of \$30,000, to manufacture all grades of wire cloth for the hardware trade and in connection therewith will do a general galvanizing business. The factory, a four-story building, will be located on Reno street, the initial equipment of which will consist of 20 looms and 2 galvanizing kettles. James W. Murphy is president; J. H. Porter, vice-president, and W. E. Richmond, secretary and treasurer.

Business with the Buckeye Jack Mfg. Company, Louisville, Ohio, has been growing so rapidly and it has become so difficult for the company to get sufficient labor in its little city that the concern is seriously thinking of removing the plant to a point where there will be access to a larger field of laborers. The company has quite a number of propositions from cities in different parts of the country, but nothing definite has yet been determined. It will, however, be necessary to make a material increase in the company's capacity.

Miscellaneous.

The Davis Mfg. Company, Milwaukee, Wis., has been awarded contract for furnishing steel bins for the new plant of the Avery Scale Company at Milwaukee and also has contract for an installation of bins in the New York Edison Company's plant at New York.

James Bonar & Co., Incorporated, Pittsburgh, Pa., is installing seven Bonar automatic oiling systems for the Bethlehem Steel Company at its new plant at South Bethlehem, Pa. The company has just completed a system for the McClintic-Marshall Construction Company, Pittsburgh; Pittsburgh Plate Glass Company, Ford City, Pa., and Ellsworth Coal Company, Ellsworth, Pa. The systems are being used by such concerns as Carnegie Steel Company, Jones & Laughlin Steel Company, American Sheet & Tin Plate Company, United States Government, Pittsburgh Railways Company, and many others.

The American Car & Foundry Company, St. Louis, Mo., has under consideration the erection of a large steel car plant, the location for which has not been decided upon.

The Indiana Road Machine Company, Fort Wayne, Ind., is building an addition to its blacksmith shop, increasing the size of its wood shop, and also erecting a new warehouse and store-rooms. Additional machinery needed for these improvements has been contracted for.

The Pennsylvania Railroad Company is showing some remarkable economies in its forge shops at Altoona, Pa. Producer gas has been installed on five furnaces, and 7 tons of coal is now doing the work that formerly required 20 tons. The gas producer equipment was supplied by the Morgan Construction Company, New York. The latter company also reports five successive orders within eight months from the Pittsburgh Reduction Company for gas producers. For several years this company has been using the hand-fed type of producer, and now

that it has had an opportunity to compare results with the automatic Morgan producers, it has decided to use nothing else and is at present installing 16. Eight are for heating six rotary kilns for calcining bauxite ore and eight are for heating five rotary kilns for burning lime and generating CO₂. The kilns are all 7 ft. in diameter by 120 ft. long.

The Cushion Wheel & Tire Company, Syracuse, N. Y., has incorporated to manufacture wheels and tires for automobiles, trucks and friction and transmission pulleys of all kinds. Thomas H. Ward, 421 University Block, is president; Edward D. Woods, vice-president and general manager, and Edward Mitchell, secretary and treasurer.

The Lancaster Mfg. Company, Lancaster, Pa., has incorporated to manufacture electric track brakes and shoes for surface, elevated and subway cars under patents of Emanuel L. Fenstermacher. It has not yet been fully decided whether the company will take up an existing plant or build a new one. A. H. Powden is interested.

It is understood that the Standard Steel Car Company, Pittsburgh, has made a large appropriation for extensions to the works of the Standard Steel Car Forge Company, New Castle, Pa., which is an identified interest of the former company. Steel car trucks are to be made at the New Castle works on a large scale.

The Wheeling Corrugating Company, Wheeling, W. Va., intends to move a portion of its galvanizing and roofing department from Wheeling to its plant at Martin's Ferry, Ohio, where it has more room.

The Buffalo Valve Company, 911 White Building, Buffalo, N. Y., recently incorporated, has taken up an existing plant in which it will manufacture a special valve to be used in connection with wine and other liquors. The company contemplates the construction of a larger plant this winter, to include a foundry, and when this plant is completed the company will very likely go into general foundry and machine work, making a specialty of castings of aluminum composition. The president and directors are Robert Stock, president; W. W. Smith, vice-president; C. R. Wyckoff, treasurer, and E. S. Newhall, secretary.

The Miller Foundry & Specialty Company, Tonawanda, N. Y., manufacturer of brass fittings and plumbers' supplies, has located its new factory at North Tonawanda, where it will have greatly enlarged facilities.

The Automatic Trolley Guard Company has been incorporated at Buffalo, N. Y., with a capital of \$10,000, to manufacture a patent automatic trolley guard and other railroad appliances. The incorporators are Frank J. Nolan, H. P. Gates and M. J. Nolan.

To Determine Sulphur Segregation.—A method is suggested by a writer in *Metallurgie* for ascertaining whether the sulphur shown by analysis to exist in iron is finely distributed through the sample or is concentrated at certain points. A small piece of silver bromide paper, such as is used by photographers, is moistened with dilute sulphuric acid, and the superfluous moisture is removed. It is then applied to the surface of the metal, which must have been filed smooth and freed from oil and grease. After remaining in contact with the iron for a short time the paper may be withdrawn. In case sulphur exists in patches or layers it will produce dark stains on the paper by a process of nature printing, while the paper will remain uncolored in the places where sulphur is absent. The impression may then be fixed and washed in the usual way. Many different prints can be taken from any metal surface, and no dark chamber is necessary. Illustrations are given of bromide paper impressions from various polished sections of iron plates, bars and rivets, showing spots and streaks of sulphur. The basis of the process is the reaction of sulphuretted hydrogen on salts of silver.

The Goldschmidt Thermit Company is about to vacate its present manufacturing premises at 179 Christopher street, New York City, as they are insufficient for the largely increased business. The company has bought ground at the corner of Cornillon and Bishop streets, in Jersey City, has erected there a commodious factory building, 75 x 165 ft., and intends moving the manufacturing plant to the new location on or about October 1. The new factory is within easy reach of the company's main office at 43-49 Exchange place, New York.

A London news dispatch states that orders for 500 motor buses for use in London and other English cities were recently awarded to three German manufacturing concerns. The contracts aggregate approximately \$1,500,000.

The Iron and Metal Trades

On the whole, the Pig Iron markets throughout the country have been quiet, with occasional spells of activity cropping out locally. The latter feature grows out of the appearance of inquiries both for prompt and forward delivery. Generally speaking, quotations are about \$1 higher for the former. A good deal is being made of the new furnace capacity which will become available during the next six months, but experience has only too often taught that expectations as to the date of blowing in of new furnaces are rarely realized.

Aside from some imports of Low Phosphorus Pig, of which another cargo of 5000 tons is now on the ocean, there is nothing doing as yet in foreign Iron for consumption on this side. It would not be surprising, however, if some business of this character in Foundry Iron were arranged.

From the West come reports of increasing scarcity of Steel. There are in the Chicago market now two inquiries of 10,000 tons each of Forging and Axle Billets, while the Union Pacific Railroad is in the market for 14,500 tons of Billets to be rolled at the Laramie mill in Wyoming at the rate of 1500 to 2000 tons a month. Steel works in the Chicago District are unable to handle this business.

The railroads continue to appear as important buyers for next year. The Pennsylvania Company has placed orders for 15,000 Steel cars and the Vanderbilt lines for 21,000 cars. There are in the market, too, inquiries for Steel Rails aggregating between 150,000 and 200,000 tons. It is noted also that there is an inquiry for 22,000 tons of Rails for Cuba. The largest sale of Rails during the week has been a lot of 38,000 tons for the Erie. The order for 5000 tons for Panama has been awarded.

A good run of moderate sized contracts for Structural Material has come to the mills. Included in them is 5000 tons for the two new plants in the Chicago and Pittsburgh districts of the Universal Portland Cement Company, a new subsidiary company of the United States Steel Corporation, which is handling the rapidly developing cement production of the corporation.

In the lighter lines, it is the old story of enormous pressure to meet the demands. In the Wire industry there has been an advance of \$1 per net ton all along the line. In the Sheet trade a premium of \$1 per ton on the heavier gauges is growing more general, while in the Tin Plate trade a somewhat significant incident is that there have been small sales of foreign Tin Plates for domestic consumption for very prompt delivery, it being impossible to secure domestic Tin Plate.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

	Sept. 26, 1906.	Sept. 19, 1906.	Aug. 29, 1906.	Sept. 27, 1905.
PIG IRON, Per Gross Ton:				
Foundry No. 2, Standard, Philadelphia	\$20.50	\$20.50	\$19.75	\$16.75
Foundry No. 2, Southern, Cincinnati	19.00	19.00	18.00	14.75
Foundry No. 2, Local, Chicago ..	20.00	19.75	19.50	16.50
Bessemer, Pittsburgh	19.60	19.60	19.35	16.35
Gray Forge, Pittsburgh	17.85	17.35	17.35	15.10
Lake Superior Charcoal, Chicago ..	20.50	20.00	19.50	17.00
BILLETS, &c., Per Gross Ton:				
Bessemer Billets, Pittsburgh ..	28.00	28.00	28.00	25.00
Forging Billets, Pittsburgh ..	34.00	34.00	34.00	29.00
Open Hearth Billets, Phila.	32.00	32.00	29.50	27.00
Wire Rods, Pittsburgh	00	34.00	34.00	31.50
Steel Rails, Heavy, Eastern Mill ..	28.00	28.00	28.00	28.00
OLD MATERIAL, Per Gross Ton:				
Old Steel Rails, Chicago	17.00	16.50	16.00	14.50
O. Steel Rails, Philadelphia ..	18.50	18.25	17.50	16.25
O. Iron Rails, Chicago	25.50	23.50	23.00	21.00
O. Iron Rails, Philadelphia ..	25.00	24.00	21.50	22.00
O. Car Wheels, Chicago	19.00	20.00	19.50	16.00
O. Car Wheels, Philadelphia ..	19.00	19.50	17.00	15.50
Heavy Steel Scrap, Pittsburgh ..	17.50	16.50	17.00	16.00
Heavy Steel Scrap, Chicago ..	16.50	16.50	16.00	14.50
FINISHED IRON AND STEEL,				
Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined Iron Bars, Philadelphia ..	1.83½	1.83½	1.73½	1.68½
Common Iron Bars, Chicago ..	1.71½	1.71½	1.71½	1.65
Common Iron Bars, Pittsburgh ..	1.60	1.60	1.50	1.74½
Steel Bars, Tidewater, New York ..	1.64½	1.64½	1.64½	1.64½
Steel Bars, Pittsburgh	1.50	1.50	1.50	1.50
Tank Plates, Tidewater, New York ..	1.74½	1.74½	1.74½	1.74½
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.60
Beams, Tidewater, New York ..	1.84½	1.84½	1.84½	1.89½
Beams, Pittsburgh	1.70	1.70	1.70	1.70
Angles, Tidewater, New York ..	1.84½	1.84½	1.84½	1.89½
Angles, Pittsburgh	1.70	1.70	1.70	1.70
Skelp, Grooved Steel, Pittsburgh ..	1.57½	1.57½	1.57½	1.50
Skelp, Sheared Steel, Pittsburgh ..	1.60	1.60	1.60	1.55
SHEETS, NAILS AND WIRE,				
Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, No. 27, Pittsburgh	2.40	2.40	2.40	2.20
Wire Nails, Pittsburgh	1.90	1.85	1.85	1.75
Cut Nails, Pittsburgh	1.90	1.80	1.75	1.60
Barb Wire, Galv., Pittsburgh ..	2.35	2.30	2.30	2.20
METALS, Per Pound:				
Lake Copper, New York	20.00	19.25	18.75	16.25
Spelter, St. Louis	6.25	6.25	5.90	5.80
Lead, New York	5.95	6.00	5.85	4.85
Lead, St. Louis	5.85	5.85	5.75	4.75
Tin, New York	40.40	40.00	40.25	32.10
Antimony, Hallett, New York ..	24.00	24.00	24.00	12.75
Nickel, New York	45.00	45.00	45.00	40.00
Tin Plate, Domestic, Bessemer, 100 lb., New York	\$3.94	\$3.94	\$3.94	\$3.74

Chicago.

FISHER BUILDING, September 26, 1906.—(By Telegraph.)

The Steel shortage, which is growing more pronounced daily, has developed inquiries for large tonnages of Rolling, Forging and Axle Billets from consumers whose source of future supply is giving them great concern and whose current needs are being only inadequately met by the mills. Quotations have been asked on two lots of Forging and Axle Billets of 10,000 tons each, for delivery through the first half, and the Union Pacific Railroad is in the market for 14,500 tons of Rolling Billets for its Laramie (Wyo.) mill, to be shipped at the rate of 1500 to 2000 tons monthly. The Illinois Steel Company has met with no success in securing Steel from other markets, and will make no further efforts to replenish its requirements in the open market. With the operation of new Light Rail and Universal Plate mills at South Chicago, now under construction, the company will be less of a factor in the unfinished Steel market than heretofore, and consumers are already looking elsewhere for their Steel supply. The importing of foreign Billets into this market has not yet been considered, although this is a probability of the near future. While further advances on Pig Iron for early delivery have been made by the Southern interests, the current demand is light and there is practically no inquiry covering future needs. The advance of \$1 a ton on Wire products announced by the American Steel & Wire Company September 20 was unexpected by the trade, especially in view of the fact that the bulk of the tonnage for the fall trade has already been placed with the mills. It gives the distributor, however, an additional profit on which to transact business, and enables the independent producers to operate at a slightly increased advantage. The tonnage now on the books of the Wire mills exceeds all

records, and deliveries are already deferred from three to four weeks. The first notable contract for Steel to be used in the reconstruction of San Francisco, amounting to 5000 tons for the Palace Hotel, has been placed with the American Bridge Company. Other orders placed with independent fitters aggregate 4000 tons, and 2500 tons for Chicago buildings are under negotiation. Owing to the increased producing capacity the pressure for Structural Material has practically subsided, and deliveries of practically all shapes and sizes can be made in two to four weeks. Old Iron Rails have advanced nearly \$3 a ton, and owing to the limited outcome and heavy demand high prices will undoubtedly prevail for some time.

Pig Iron.—The lull in the Iron market continues unbroken, the demand for both immediate and future requirements being exceedingly limited. Conditions, however, have not deterred Southern producers from making further price advances on spot Iron, which is now quoted at \$16.50 to \$17, Birmingham, for No. 2. There has been no change in the asking prices on contracts running through the first half of 1907, and No. 2 is still on the basis of \$15.50 to \$16. On Malleable Bessemer local furnaces have advanced quotations to \$21 for delivery through the remainder of the year, although it is reported that one interest is quoting \$19.50, Chicago, on this grade, and on Foundry Iron shipments after the first of the year. James B. Clow & Co. have purchased 2000 tons of Southern for last quarter delivery, but have not covered into next year. Virginia producers are uniformly quoting \$18, furnace, on Foundry and Basic, and the Tennessee Coal, Iron & Railroad Company has withdrawn on the latter grade, having disposed of its unsold tonnage within a few days. Ohio Strong Softeners for early delivery are held at prices out of proportion with the local market, and sales of only a few carload lots are reported. We quote as follows, f.o.b. Chicago:

Lake Superior Charcoal	\$20.50 to \$21.00
Northern Coke Foundry, No. 1	20.50 to 21.00
Northern Coke Foundry, No. 2	20.00 to 20.50
Northern Coke Foundry, No. 3	19.50 to 20.00
Northern Scotch, No. 1	20.50 to 21.00
Ohio Strong Softeners, No. 1	21.30 to 21.80
Ohio Strong Softeners, No. 2	20.80 to 21.30
Southern Coke, No. 1	20.40 to 20.90
Southern Coke, No. 2	19.90 to 20.40
Southern Coke, No. 3	19.40 to 19.90
Southern Coke, No. 4	18.90 to 19.40
Southern Coke, No. 1 Soft	20.40 to 20.90
Southern Coke, No. 2 Soft	19.90 to 20.40
Southern Gray Forge	17.40 to 17.90
Southern Mottled	17.15 to 17.65
Malleable Bessemer	20.50 to 21.00
Standard Bessemer	20.80 to 21.30
Jackson Co. and Kentucky Silvery, 6%	22.30 to 22.80
Jackson Co. and Kentucky Silvery, 8%	23.30 to 23.80
Jackson Co. and Kentucky Silvery, 10%	24.30 to 24.80

Metals.—Copper, Tin and Spelter have all advanced in price and higher prices are looked for as well on other metals within the next week or 10 days. Consumption is now at a rate exceeding production, and material is scarce. We quote: Casting Copper, 19½¢ to 19¾¢; Lake, 19½¢ to 19¾¢, in car lots; small lots, ¼¢ to ¾¢ higher; Pig Tin, carloads, 43.35¢; small lots, 44¢ to 44½¢; Spelter, prompt delivery, 6.40¢ to 6.50¢ for car lots; Lead, desilverized, 6¢ to 6.10¢, for 50-ton lots; Corroding, 6.67½¢ to 6.77½¢, for 50-ton lots; on car lots, 2½¢ per 100 lb. higher; Cookson's Antimony, 28¢, and other grades, 26¢ to 27¢; Sheet Zinc is 7.75¢ list, f.o.b. Lasalle, in car lots of 60-lb. casks. On Old Metals we quote: Copper Wire, 17½¢; Heavy Copper, 16½¢; Copper Bottoms, 16¢; Copper Clips, 16½¢; Red Brass, 16¢; Red Brass Borings, 13½¢; Yellow Brass, 12½¢; Yellow Brass Borings, 10½¢; Light Brass, 8½¢; Lead Pipe, 5.40¢; Tea Lead, 5¢; Zinc, 5¢; Pewter, No. 1, 26¢; Tin Foil, 32¢; Block Tin Pipe, 27½¢.

(By Mail.)

Billets and Rods.—The Union Pacific Railroad has made inquiry for 14,500 tons of Rolling Billets for its Laramie, Wyo., mill, for delivery at the rate of 1500 to 2000 tons a month. None of the Western Steel producers has quoted on this tonnage, however, and it is probable that if placed at all it will go to Eastern mills. Large inquiries also continue to be received from Western consumers of Forging and Axle Billets, but owing to the crowded conditions of all the mills no contracts have been closed. Forging Billets in small lots continue to be quoted at prices ranging from \$34 to \$36, Chicago, and Open Hearth and Bessemer Wire and Chain Rods are held at \$36 to \$37.

Rails and Track Supplies.—The inquiry for Standard Section Rails for delivery next year has improved materially and contracts for 4000 tons were awarded by the Milwaukee Electric Railway Company to the Cambria Steel Company. The Chicago Terminal Transfer Railway Company also purchased 5000 tons, while 18,000 tons for the Missouri, Kansas & Texas has been reported placed with an Eastern mill. Spikes for 1907 delivery in small lots are quoted on the basis of 2.25¢, f.o.b. Chicago, although large tonnages can still be placed on the basis of 2.10¢. Quotations are as follows: Angle Bars, accompanying Rail orders, 1906 delivery, 1.50¢; carload lots, 1.75¢; Spikes, 2.27½¢ to 2.50¢, accord-

ing to delivery; Track Bolts, 2.65¢ to 2.75¢, base, Square Nuts, and 2.80¢ to 2.90¢, base, Hexagon Nuts. The store prices on Track Supplies range from 0.15¢ to 0.20¢ above mill prices. Light Rails, 30 to 45 lb. sections, \$29 to \$30; 25-lb., \$31; 20-lb., \$32; 16-lb., \$33; 12-lb., \$34, f.o.b. mill. Standard Sections, \$28, f.o.b. mill, full freight to destination.

Structural Material.—The Steel for the new Palace Hotel, at San Francisco, amounting to 5000 tons, will be furnished by the American Bridge Company. This is the largest contract for Structural Material for building purposes that has been let in that city since its destruction. The American Bridge Company was also awarded contracts for furnishing the Steel for the plants of the Universal Portland Cement Company at Buffington, Ind., and Universal, Pa., amounting to 5000 tons. Other orders include a bridge at Milwaukee, 750 tons, let to the Strobel Steel Construction Company, Chicago; Municipal Courts Building, Chicago, 800 tons, to the Morava Construction Company, Chicago; Brooks Estate Building, Chicago, 1000 tons, to the George A. Fuller Company. Bids are also being secured on the Commercial Bank Building at Kansas City, which will require 1500 to 2000 tons, and the Byron L. Smith Building, Chicago, amounting to 1000 tons. Shipments of material from the mills continue to improve and on certain sections deliveries can be made in from two to three weeks. Material cut to length from warehouse is quoted at 2.05¢ to 2.10¢, f.o.b. Chicago. Mill quotations are unchanged, as follows: Beams and Channels, 3 to 15 in., inclusive, 1.86½¢; Angles, 3 to 6 in., ¼-in. and heavier, 1.86½¢; larger than 6 in. on one or both legs, 1.96½¢; Beams, larger than 15 in., 1.96½¢; Zees, 3 in. and over, 1.86½¢; Tees, 3 in. and over, 1.91½¢, in addition to the usual extras for cutting to extra lengths, punching, coping, bending and other shop work.

Plates.—Although no contracts of note are being placed for either Universal or Sheared Plates, current demand is growing heavier, and Western mills now have specifications before them for the next 60 or 90 days. The tonnage for two lake vessels to be built at Toledo, Ohio, is under negotiation and will probably be placed this week. Quotations are firmly maintained and unchanged, as follows: Tank Plates, ¼-in. and heavier, wider than 6¼ and up to 100 in. wide, inclusive, car lots, Chicago, 1.76½¢; 3-16 in., 1.86½¢; Nos. 7 and 8 gauge, 1.91½¢; No. 9, 2.01½¢; Flange quality, in widths up to 100 in., 1.86½¢, base, for ¼ in. and heavier, with the same advance for lighter weights; Sketch Plates, Tank quality, 1.86½¢; Flange quality, 1.96½¢. Store prices on Plates are as follows: Tank Plate, ¼-in. and heavier, up to 72 in. wide, 2¢ to 2.10¢; from 72 to 96 in. wide, 2.10¢ to 2.20¢; 3-16 in. up to 60 in. wide, 2.10¢ to 2.20¢; 72 in. wide, 2.35¢ to 2.45¢; No. 8, up to 60 in. wide, 2.15¢ to 2.25¢; Flange and Head quality, 0.25¢ extra.

Sheets.—On the heavier gauges the independent manufacturers are asking a premium of \$1 a ton, although in the lighter gauges, on which the production is heavy, some shading is reported. The current business is exceedingly heavy, considering the season, and shipments are deferred from six weeks to two months. Quotations are unchanged, as follows: Blue Annealed, No. 10, 1.91½¢; No. 12, 1.96½¢; No. 14, 2.01½¢; No. 16, 2.11½¢; Box Annealed, Nos. 17 to 21, 2.41½¢; Nos. 22 to 24, 2.46½¢; Nos. 25 and 26, 2.51½¢; No. 27, 2.56½¢; No. 28, 2.66½¢; No. 29, 2.81½¢; No. 30, 2.91½¢. Galvanized Sheets, Nos. 10 to 14, 2.61½¢; Nos. 15 and 16, 2.81½¢; Nos. 17 to 21, 2.96½¢; Nos. 22 to 24, 3.11½¢; Nos. 25 and 26, 3.31½¢; No. 27, 3.51½¢; No. 28, 3.71½¢; No. 30, 4.21½¢. Sheets from store: Blue Annealed, No. 12, 2.15¢ to 2.25¢; No. 14, 2.20¢ to 2.30¢; No. 16, 2.30¢ to 2.40¢; Box Annealed, Nos. 18 to 20, 2.60¢ to 2.70¢; Nos. 22 to 24, 2.65¢ to 2.75¢; No. 26, 2.70¢ to 2.80¢; No. 28, 2.85¢ to 2.95¢; No. 30, 3.25¢ to 3.35¢. Galvanized from store: Nos. 10 to 20, 3.10¢ to 3.20¢; Nos. 22 to 24, 3.35¢ to 3.45¢; No. 26, 3.45¢ to 3.55¢; No. 27, 3.55¢ to 3.75¢; No. 28, 3.85¢ to 3.95¢; No. 30, 4.45¢ to 4.55¢.

Bars.—Although the Republic Iron & Steel Company continues to maintain Iron Bars on the basis of 1.60¢, Pittsburgh, equivalent to 1.76½¢, Chicago, most of the independent mills are quoting \$1 a ton less, although on material for prompt delivery 1.55¢ is sometimes asked. Western mills generally are from two to three months behind their specifications on Steel Bars, and, unless there is a material improvement in the supply of Steel deliveries will be still further deferred during the next two months. We quote as follows: Iron Bars 1.71½¢ to 1.76½¢; Steel Bars, 1.66½¢ to 1.76½¢, both half extras; Hoops, 2.06½¢, extras as per Hoop card; Bands, 1.66½¢, as per Steel card; Soft Steel Angles and Shapes, 1.66½¢, half extras. Store prices are as follows: Bar Iron, 2.10¢; Steel Bars, 1.85¢, and as high as 2¢ is asked on certain scarce sizes; Steel Bands, 1.85¢ to 1.90¢, half extras; Soft Steel Hoops, 2.30¢ to 2.40¢, full extras.

Merchant Pipe.—The mills report a heavy demand from the distributing trade, although little tonnage is being placed to cover future requirements. On account of the low prices that are prevailing for the finished product and the high

cost of Skelp, one large producer has been compelled to shut down his mills, and it is reported that several other manufacturers are running light on small sizes. Sales are made on the basis of 81 and 5 off the list, Pittsburgh, and discounts in car lots, Chicago, are as follows: Black Steel Pipe, 79.35 per cent. on the base sizes, $\frac{3}{4}$ to 6 in., and Galvanized, 69.35 per cent. Iron Pipe is quoted from $1\frac{1}{2}$ to 2 points higher. From store in small lots Chicago jobbers are quoting 76 $\frac{1}{2}$ to 77 per cent. on Black Steel Pipe, $\frac{3}{4}$ to 6 in.

Boiler Tubes.—Little new tonnage is being received by the manufacturers either from the jobbers or the railroads, as shipments are now generally coming forward on contracts placed earlier in the year. Store demand, however, is heavy and concessions have been entirely withdrawn. Mill quotations are well maintained, as follows, on base sizes, 2 $\frac{3}{4}$ to 5 in., in car lots: Steel Tubes, 68.35; Iron, 55.35; Seamless, 50.35; 2 $\frac{1}{2}$ in. and smaller and lengths over 18 ft., and 2 $\frac{1}{2}$ in. and lengths over 22 ft., 10 per cent. extra. Store prices are unchanged, as follows:

	Steel.	Iron.	Seamless.
1 to 1 $\frac{1}{2}$ in.....	40	35	42 $\frac{1}{2}$
1 $\frac{1}{2}$ to 2 $\frac{3}{4}$ in.....	50	35	35
2 $\frac{3}{4}$ in.....	52 $\frac{1}{2}$	35	30
2 $\frac{3}{4}$ to 5 in.....	60	47 $\frac{1}{2}$	42 $\frac{1}{2}$
6 in. and larger.....	50	35	..

Merchant Steel.—Specifications from implement manufacturers are constantly increasing, and while fairly prompt shipments have been made during the past few months the mills are gradually falling behind on deliveries. Quotations, however, are unchanged and firmly maintained, as follows: Planished or Smooth Finished Tire Steel, 1.86 $\frac{1}{2}$ ¢; Iron Finish, up to 1 $\frac{1}{2}$ x $\frac{1}{2}$ in., 1.81 $\frac{1}{2}$ ¢; Iron Finish, 1 $\frac{1}{2}$ x $\frac{1}{2}$ in. and larger, 1.66 $\frac{1}{2}$ ¢, base; Channels for solid rubber Tires, $\frac{3}{4}$ to 1 in., 2.16 $\frac{1}{2}$ ¢, and 1 $\frac{1}{2}$ in. and larger, 2.06 $\frac{1}{2}$ ¢; Smooth Finished Machinery Steel, 1.91 $\frac{1}{2}$ ¢; Flat Sleigh Shoe, 1.71 $\frac{1}{2}$ ¢; Concave and Convex Sleigh Shoe, 1.96 $\frac{1}{2}$ ¢; Cutter Shoe, 2.35¢; Toe Calk Steel, 2.21 $\frac{1}{2}$ ¢; Railway Spring, 1.86 $\frac{1}{2}$ ¢; Crucible Tool Steel, 6 $\frac{1}{2}$ ¢ to 8¢, and still higher prices are asked on special grades. Shafting, 50 per cent. off in car lots and 45 per cent. in less than car lots, in base territory.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Company is practically sold up on the smaller sizes through the remainder of the year and has only a small tonnage of large Pipe for December shipment. The buying for 1907 requirements has already commenced, one railroad interest having purchased 600 tons for delivery through the first three months. We make the following quotations: Water Pipe, 4 in., \$34; 6, 8, 10 and 12 in., \$33; over 12 in., \$32, with \$1 extra for Gas Pipe.

Coke.—By-Product Coke has again been advanced 25c. a ton and Connellsville Foundry Coke is held practically on the same basis. On account of the inability of consumers to secure shipments of material contracted for several months ago there is a growing demand for spot Coke. We quote 72-hour Connellsville Coke at \$5.90 to \$6.15; Virginia, \$5.25 to \$5.40; By-Product, \$6 to \$6.15.

Old Material.—Iron Rails have advanced sharply, and as the available stocks are largely in the hands of the dealers still higher prices are looked for in the immediate future. The outcome of Iron Rails has also declined to a large extent, one Western road which formerly disposed of 20,000 to 25,000 tons a year now having not more than 2000 tons to offer. The Pullman Company has purchased a round tonnage, and it is reported that close to \$26 was paid. Iron Fish Plates and Car Axles are likewise held on a higher basis. The Chicago, Milwaukee & St. Paul Railroad last week disposed of approximately 1500 tons of material at fairly high prices. The company's list included 500 tons of Old Iron Rails. The Chicago, Burlington & Quincy this week will dispose of 1500 tons. Consumers generally are not in the market and the railroad offerings are being taken by the dealers at prices considerably above those that the mills are willing to pay. Quotations on gross tons, car lots, f.o.b. Chicago, are as follows:

Old Iron Rails	\$25.50 to \$26.00
Old Steel Rails, 4 ft. and over.....	18.00 to 18.50
Old Steel Rails, less than 4 ft.....	17.00 to 17.50
Heavy Relaying Rails, subject to inspection, 50 lb. and under.....	28.50 to 29.00
Old Car Wheels	19.00 to 19.50
Heavy Melting Steel Scrap.....	16.50 to 17.00
Frogs, Switches and Guards	17.00 to 17.25
Mixed Steel	14.00 to 14.50

The following quotations are per net ton:

Iron Fish Plates	\$20.00 to \$20.50
Iron Car Axles	25.00 to 25.50
Steel Car Axles	20.50 to 21.00
No. 1 Railroad Wrought.....	16.50 to 17.00
No. 2 Railroad Wrought.....	15.50 to 16.00
Railway Springs	15.50 to 16.00
Locomotive Tires, smooth	16.00 to 16.50
No. 1 Dealers' Forge.....	13.50 to 14.00
Mixed Busheling	11.00 to 11.50
Iron Axle Turnings	11.00 to 11.25
Soft Steel Axle Turnings.....	11.00 to 11.25
Machine Shop Turnings	11.00 to 11.25
Cast Borings	8.50 to 9.00
Mixed Borings, &c.....	8.50 to 9.00
No. 1 Mill	10.00 to 10.50
No. 2 Mill	9.00 to 9.50

No. 1 Rollers, cut to Sheets and Rings.....	11.00 to 11.50
No. 1 Cast Scrap	15.00 to 15.50
Stove Plate and Light Cast Scrap.....	12.50 to 13.00
Railroad Malleable	15.00 to 15.50
Agricultural Malleable	14.50 to 15.00

Philadelphia.

REAL ESTATE TRUST BUILDING, September 25, 1906.

Conditions in the Iron and Steel trades are not essentially different from those of the past two or three weeks. Prices of Pig Iron are a shade dearer for spot lots, \$23 having been paid for October deliveries of No. 2 X, while there is still a very urgent inquiry for that and the month following without much prospect of any great relief. Stocks at furnaces are extremely low, and those who can deliver promptly can name almost their own prices. This applies more particularly to Foundry Irons, although none of the various grades are plentiful. The pressure is for Foundry Iron, however, and as the price is much out of proportion with other grades it is probable that some furnaces will be switched to Foundry Iron to secure the extra prices. There is nothing to indicate decreased consumption, but the reverse, as orders are being taken by all the large consumers to the fullest extent of their capacity for months to come. Consumption, therefore, will be limited only by the supply of material and by the capacity to absorb it. There is business enough to give full employment to nearly all the large shops for months to come, while the multitudinous small trades are equally well employed. It is a remarkable fact that the chief anxiety is not to get new business, but to get out what has already been undertaken. Extensions and improvements in old plants are being pushed to completion, but from present appearances the time is not yet in sight when there will be any excess of capacity.

Pig Iron.—The Pig Iron situation is a perplexing problem at the present time. Those who are the closest students of the Iron interests have been somewhat out of their reckoning during the past few months. Some who always expect advances, and never expect declines, are having their innings, but the market cannot go one way all the time. It is probably safe to say that \$20 will be the minimum for No. 2 X Foundry the remainder of the year, and that the extreme high prices of to-day will be the maximum. What they will be during the first half of 1907 is a difficult problem to solve. A very large tonnage has been taken at prices ranging from \$19 to \$21. The low figure was made before the buying movement had made much headway; the higher figure is the one which the majority of the furnaces are now quoting, and at which a considerable tonnage has been taken. New buying cannot be very heavy during the next three or four months, but in the meanwhile the ground will be in course of preparation for the next buying movement. What are prices to be then? It is surely a long way ahead to consider matters of this kind, but in the Iron trade it is necessary to be a long way ahead. The situation appears to be about this: Prices cannot vary much from their present level during 1906, but the character and extent of the output in that period will doubtless have an important influence in determining what the prices are to be through 1907. If production increases to an extent that will allow free deliveries on contracts already made and leave an easy working surplus for the current demand, prices are liable to shade off possibly \$1, or more than that, according as the surplus may be more or less than is required to cover maturing contracts. The presumption is that by the end of the year the output will be at least 25,000 tons per week more than at present, and it is not unlikely that three months later it will be 40,000 tons greater than was shown by the last furnace report. There is every inducement for the largest possible production. Prices are highly remunerative, customers need Iron and the furnace capacity is ample, so that unless something unusual and unforeseen occurs to prevent it there should be a larger production the first half of 1907 than has yet been recorded. It should not be assumed, however, that this necessarily means a weak market. It will no doubt hold prices at reasonable figures and result in some reaction from the fancy prices that are now being paid, which in any case cannot be maintained for any length of time. Scotch Iron is already being imported, and when prices reach to-day's figures the scarcity soon ends. Consumption will no doubt reach larger proportions than ever, but conservative opinions appear to be that the next buying movement will be at prices not higher than those of to-day, and may be \$1 to \$2 lower, depending entirely upon developments the next 60 or 90 days. The irregularity in prices, as mentioned in recent reports, is in no degree abated. Spot No. 2 X Foundry brings \$23 and over, and from that all the way down to \$21.50 for deliveries to the end of the year. For the first half of 1907 the range is \$20.75 to \$21.25; some ask a little more than the high figure, some might shade the inside one under certain conditions. Sellers are somewhat undecided as to their position and ready to go with the tide, whichever way it may be. Scotch Iron under low freights may be a close competitor at some points, but it will take time to determine relative values and adjust

them on a safe basis. Low Phosphorus is coming in pretty steadily, another 5000-ton cargo having been bought for immediate shipment. The cost at seaboard, freight and duty paid, will be around \$24, according to the rate of freight. The market for this class of Iron is decidedly stronger. Sales of 100 to 300 ton lots have been made at \$25.50 to \$26 for spot deliveries. For later dates 50c. to 75c. better might perhaps be done, but the market is strong. Basic Iron is dull, but prices are firm at about \$18.75 to \$19, according to delivery. Some holders have been asking close to \$20 for spot lots, but a sale late last week was at a shade less than \$19. The general range for eastern Pennsylvania and adjoining districts would be about as follows for deliveries in buyers' yards:

No. 1 X Foundry.....	\$21.50 to \$22.00
No. 2 X Foundry.....	20.50 to 21.25
No. 2 Plain.....	20.25 to 20.00
Standard Gray Forge.....	17.75 to 18.25
Ordinary Gray Forge.....	17.25 to 17.50
Basic.....	18.75 to 19.00
Low Phosphorus.....	25.00 to 26.00
Malleable.....	21.00 to 21.50

Steel.—The demand for Steel keeps up to the fullest capacity of the mills, and quick shipments are almost unobtainable. For such lots (when deliveries can be arranged) prices range from \$32 to \$33 for ordinary Rolling Billets and possibly a trifle less for deferred deliveries. Forging Billets bring \$36 to \$40.

Steel Alloys.—There is more activity in alloys, but it is difficult to give close quotations, the variations being very wide. Sales mentioned are 11 per cent. Ferrosilicon at \$31.50 and 50 per cent. at \$100 for spot, and \$97 to \$98 asked for last quarter. Ferromanganese, 80 per cent., is quoted \$90 for spot and \$82.50 to \$85 for last quarter and about \$80 for first quarter of 1907, and 20 per cent. Spiegel at \$37.50.

Plates.—There is no material change to note in this line. Mills are well employed and consumption continues at the highest limits, with every prospect that it will be maintained for an indefinite period. The following are firm quotations:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel.....	1.73½	1.78½
Flange or Boiler Steel.....	1.83½	1.88½
Marine.....	2.13½	2.18½
Locomotive Firebox Steel.....	2.23½	2.28½
The above are base prices for ¼-in. and heavier. ing extras apply:		
3-16-in. thick.....		\$0.10
Nos. 7 and 8, B. W. G.....		.15
No. 9, B. W. G.....		.25
Plates over 100 to 110 in.....		.05
Plates over 110 to 115 in.....		.10
Plates over 115 to 120 in.....		.15
Plates over 120 to 125 in.....		.25
Plates over 125 to 130 in.....		.50
Plates over 130 in.....		1.00

Structural Material.—The movement is very heavy, but the capacity for production has grown to such an extent that deliveries are readily secured on 30 to 60 days' notice, and in the case of small lots they can be delivered almost immediately. Consumption is very large, however, and there seems to be enough business to keep all the mills busy. Prices are unchanged at 1.83½c. to 2c. for Beams, Channels and Angles, according to specifications.

Bars.—The demand for Bars is very heavy, Steel Bars especially. Prices are supposed to be 1.73½c., but buyers have to pay \$1 or \$2 more, or wait till the mills can give them their deliveries. Refined Bar Iron is held at 1.83½c. to 1.88½c., although a trifle better can be done on first-class business. Consumption is very large, however, and prospects are such as to warrant manufacturers holding for full prices.

Sheets.—The demand is fully maintained, and at the advance noted last week buyers are taking liberal quantities. Quotations are as follows for ordinary lots and a tenth less for mill shipments: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c., and No. 28, 2.90c.

Old Material.—The market is very strong, and prices maintain their upward tendency. Advances are paid on almost everything on the list, and holders seem to expect still higher figures before the snow flies. Bids and offers for deliveries in buyers' yards are about as follows:

Steel Crops.....	\$18.50 to \$19.00
No. 1 Steel Scrap.....	18.25 to 18.50
Low Phosphorus Scrap.....	23.00 to 23.50
Old Iron Axles.....	25.00 to 26.00
Old Iron Axles.....	31.00 to 32.00
Old Iron Rails.....	25.00 to 26.00
Old Car Wheels.....	19.00 to 20.00
Choice Scrap, R. R. No. 1 Wrought.....	22.50 to 23.00
Choice No. 1 Yard Scrap.....	19.00 to 20.00
Long and Short.....	18.00 to 18.50
Machinery Scrap.....	18.25 to 18.75
Wrought Iron Pipe.....	16.25 to 16.75
No. 1 Forge Fire Scrap.....	15.50 to 16.50
No. 2 Light Ordinary.....	11.50 to 12.00
Wrought Turnings.....	14.25 to 14.75
Axle Turnings, Choice Heavy.....	15.75 to 16.00
Stove Plate.....	14.00 to 14.50
Cast Borings.....	11.50 to 12.00

Cleveland.

CLEVELAND, OHIO, September 25, 1906.

Iron Ore.—The car situation continues the most important factor in the lake Ore trade, having put a check on a good, strong movement in September. It was feared that boats would be so largely in demand in the other lake trades during September that the normal movement of Ore would be impossible; but with boats practically free to enter the Ore trade to the customary extent the car shortage has been such a serious menace that some of the vessel concerns are kept busy with their contract Ore, paying little or no attention to wild rates. Enough Ore, however, has been moved this month to assure practically the movement of 36,000,000 tons or upward for the season. But the amount of Ore shipped by lake is not the determining factor during the winter. The grade has a good deal to do with the shortage which is feared, since known movements of high grade Ores are light, the low grades predominating. In addition there is an increased consumption, due to the more steady operation of the furnaces as well as to their increased number. Furnace interests are really alarmed over prospects for the winter as promising a less supply. The smaller and less regular consumers of Ore have tried to obtain some assurance from the Ore shippers that their needs will be taken care of for another year. It has been impossible to exact any promise to that effect, since the known demands of well established trade will probably run above the possible production next year, with the present pace continued. Although such considerations are looking a good deal to the future, the subject is discussed, nevertheless, with seriousness and concern. Few sales of Ore have been made for next year's delivery, but local selling firms have assured their regular patrons a sufficient supply will be reserved for their use. Prices and rates are unchanged.

Pig Iron.—A sharp upturn has been seen during the week in Steel making Irons. Several lots of Basic, ranging above 1000 tons, have been sold at \$18.75, Valley furnace, for second quarter delivery, while some sales have been made running through the first half at \$19. Buyers are in the market to cover immediate needs for small amounts, and find it practically impossible to get even carload lots for quick shipment. Spot Iron would sell easily at \$20, if any were to be had. Bessemer is still stronger. There is none for quick shipment, and there is such a sharp demand for first half material that the price is ruling easily at \$19, Valley furnace. In Foundry Iron practically all available for immediate delivery has been sold. One of the biggest furnace interests has refused to quote for the remainder of this year. Spot Iron is quoted nominally at \$20 for No. 2 at Valley furnace. Most of the furnaces have refused to quote on first quarter delivery alone, but are making a price of \$18.50 for No. 2 for first half delivery, taking in this way some more for first quarter shipment. In all grades it is promised that there is likely to be the same premium paid on spot Iron during the first quarter, and possibly during the first half of the year. Southern No. 2 is still quoted here at \$15.50, Birmingham, but some sales have been made as high as \$17, Birmingham, for prompt shipment.

Coke.—The market appears just a little easier. Practically the same price is quoted for spot shipment and on contract. The best grades of 72-hour Foundry are quoted at \$3.75 at the oven, and the best grades of Furnace are quoted at \$3 at the oven.

Finished Iron and Steel.—The shortage of cars and raw Steel are the most vital influences in the Finished Steel market at present. Production is apparently satisfactory in most lines, but deliveries are slow and growing worse. Billets are in the main out of the market. The demand for Forging Billets is exceptionally strong and the supply limited. The ruling price is about \$35 at the mill, Pittsburgh. Most of the supply comes from the East, on which the freight rate is much higher, increasing the cost to the consumer. Plates are comparatively easy, due to increased production, and deliveries are possible in a short time, amounting almost to immediate delivery. The lake shipyard demand is still strong, being increased by a number of boat disasters recently. Despite the increased output of Shapes, the demand is growing so rapidly that some sales are made at a premium of \$2 for quick shipment. Sheets are strong, largely due to the scarcity of raw material. Stock prices are unchanged at 2.15c. for No. 10 Blue Annealed, 2.80c. for No. 26 One Pass Cold Rolled and 3.80c. for No. 28 Galvanized. Bar Iron is strong, partly due to the price of Scrap. The market rules at 1.70c., Pittsburgh.

Old Material.—While the Scrap market is holding firm, it is recognized as really an artificial condition. Dealers are holding prices up, with a fairly good demand but a large supply. The following are dealers' prices to the trade, f.o.b. Cleveland, per gross ton: Old Steel Rails, \$17 to \$18; Old Iron Rails, \$25 to \$26; Iron Car Axles, \$20 to \$21; Heavy Melting Steel \$17 to \$18. Per net ton: Cast Borings, \$9 to \$10; No. 1 Busheling, \$15; No. 1 Railroad Wrought, \$16.50 to \$17; No. 1 Cast, \$15 to \$15.50; Iron and Steel Turnings and Drillings, \$11 to \$12.

Birmingham.

BIRMINGHAM, ALA., September 23, 1906.

Pig Iron.—There has been very little change in market conditions since last week. Prices remain unchanged, and while there is some business being done, both in spot Iron and for delivery over first half of 1907, the volume is not large. Prices for the latter delivery continue at \$15 to \$16, with probably the majority of sales going at \$15.50. Some disappointment is felt at the small increase in production now under way, as it was expected that better progress would have been made before this. The furnace of the Southern Steel Company at Trussville, which was to have been blown in on the 15th, is still out and its resumption is now placed at October 6. The furnace of the Central Iron & Coal Company at Holt was blown out for relining and changes on the 21st, and will probably be down at least 90 days. The Woodward Iron Company has just blown in a stack which has been undergoing repairs for several months. The production for September in Alabama will probably be only about the usual average, but October should show a healthy gain. The car shortage is increasing, and while it has not yet reached such proportions as to seriously affect shipments, it is predicted by railroad officials that this winter will be the worst in their history.

Cast Iron Pipe.—Several small lettings, varying from 500 to 1000 tons, are advertised for the near future, but none of the large buyers for next spring's delivery are yet in this market. With the Iron trade in its present condition the manufacturers are not anxious to take on any very large additional tonnage, preferring to clean up some of the business they now have on their books, as they have been able to make but little progress toward this end for some months. Prices on Water Pipe remain unchanged and are approximately as follows: 4 to 6 in., \$30; 8 to 12 in., \$29; over 12-in., \$27.50, with \$1 per ton extra for Gas Pipe. On large contracts these prices might be slightly shaded, but on small orders a slight advance would probably be required.

Old Material.—The market is strong, with the demand constantly increasing. Wrought is moving more freely, but Cast continues the leading seller. Dealers' quotations are about as follows per gross ton, f.o.b. yards here:

Old Iron Rails	\$19.50 to \$20.00
Old Iron Axles	18.50 to 19.00
Old Steel Axles	16.00 to 17.00
Old Car Wheels	16.50 to 17.50
No. 1 Railroad Wrought	16.50 to 17.00
No. 2 Railroad Wrought	14.50 to 15.00
No. 1 Country Wrought	14.50 to 15.00
No. 2 Country Wrought	11.50 to 12.00
Wrought Pipe and Flues	11.50 to 12.00
Railroad Malleable	13.00 to 13.50
No. 1 Steel	13.00 to 13.50
No. 1 Machinery Cast	13.50 to 14.00
Stove Plate and Light Cast	10.00 to 10.25
Cast Borings	7.00 to 7.50

The directors of the Sloss-Sheffield Steel & Iron Company spent the past week in the district inspecting their properties. They express themselves well satisfied with conditions, and while stating that this is merely their annual inspection tour and has no special significance, intimate that something interesting may be expected at the next meeting. President Maben will shortly leave for a three or four months' vacation in Europe.

The De Loach Mill Mfg. Company announces that it will remove its plant from Atlanta, Ga., to Bridgeport, Ala. Work on the new plant will begin October 1, and it is expected will be completed by January 1. The reason assigned for the change is a desire to be nearer its source of supply of raw material and thus effect a large saving in freight.

Cincinnati.

FIFTH AND MAIN STS., Sept. 26, 1906.—(By Telegraph.)

Pig Iron.—The market appears to be considerably stronger than it was last week, and agents report a number of sales aggregating no small tonnage. The indications are that stocks in both consumers' and furnace yards are very low, and there is a constant effort on the part of melters to receive the Iron due them on contracts. The higher grades, both in the North and South, are exceptionally short, said to be due largely to the extremely humid weather that has prevailed the past month. As a result of this there has been an exceedingly heavy call for the lower grades, and Gray Forge and No. 4 are hard to obtain. Melters who have been using No. 2 almost exclusively are reported as having bought quite a tonnage of lower grades to keep from shutting down temporarily. Soft Foundry grades are even more difficult to secure than regular Foundry, and it is almost impossible to find any for spot shipment. Prices for Southern No. 2 are slightly stronger, deliveries for this year being quotable from \$16 to \$17 and for next year \$15 to \$15.50, Birmingham. In the North the situation is possibly more strenuous, and there is said to be less Iron available for spot delivery than in the South. The Ore situation and labor troubles are causing considerable uneasiness among furnacemen, and general conditions are very tight. Prices are about the same as

last week, spot deliveries when obtainable being quotable at \$19, with sales into next year at \$18 at furnace. While most of the inquiries as well as sales during the week appear to be made up of small requirements, there are several that contemplate considerable tonnage. One of the inquiries is for 3000 to 5000 tons of Gray Forge for early delivery, with a sale of about 2000 tons in Pittsburgh territory. An Ohio melter is in the market for 10,000 tons of Foundry grades, delivery covering first half of next year. Freight rates from Hanging Rock district to Cincinnati are \$1.15, and from Birmingham, \$3. We quote, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1	\$19.50 to \$20.50
Southern Coke, No. 2	19.00 to 20.00
Southern Coke, No. 3	18.50 to 19.50
Southern Coke, No. 4	17.75 to 18.25
Southern Coke, No. 1 Soft	19.50 to 20.50
Southern Coke, No. 2 Soft	19.25 to 20.25
Southern Coke, Gray Forge	17.00 to 17.50
Southern Coke, Mottled	16.25 to 16.75
Ohio Silvery, No. 1	23.65
Lake Superior Coke, No. 1	20.65
Lake Superior Coke, No. 2	20.15
Lake Superior Coke, No. 3	19.65

Car Wheel Irons.

Standard Southern Car Wheel	\$25.50 to \$26.00
Lake Superior Car Wheel	24.50 to 25.00

Coke.—The market is very strong, and the available supply is somewhat restricted. Railroad equipment is so much in demand for other commodities that it is feared it will be difficult to obtain enough cars to take care of Coke contracts already made. We quote the best brands of 72-hour Foundry as follows: Wise County, Virginia, \$3.25 to \$3.50; Connellsville, \$3.50 to \$3.85, f.o.b. ovens.

Finished Iron and Steel.—Specifications are said to be coming forward for the first six months of next year. Trade is active and prices are strong. Heavy contracts for Bar Iron have been made for delivery through the first six months of next year. Structural and Boiler Rivets have advanced \$1 per ton. We quote, f.o.b. Cincinnati, as follows: Iron Bars, in carload lots, 1.73c., with half extras; the same, in smaller lots, 2c., with full extras; Steel Bars, in carload lots, 1.63c., with half extras; the same in smaller lots, 1.85c., with full extras; Base Angles, 1.83c., in carload lots; Beams and Channels, in carload lots, 1.83c.; Plates, 1/4-in. and heavier, 1.73c., in carload lots; in smaller lots, 1.90c.; Sheets, 16 gauge, in carload lots, 2.15c.; in smaller lots, 2.70c.; 14 gauge, in carload lots, 2.05c.; in smaller lots, 2.60c.; Steel Tire, 1 x 1/4 in. or heavier, 1.83c., in carload lots.

Old Material.—The market is strong, prices having moved slightly up. We quote dealers' prices, f.o.b. Cincinnati, about as follows: No. 1 Railroad Wrought, \$17 to \$18, net ton; Cast Borings, \$8 to \$9, net ton; Steel Turnings, \$10 to \$11 net ton; No. 1 Cast Scrap, \$15 to \$16, net ton; Iron Rails, \$21 to \$21.50, gross ton; Steel Rails, rolling mill lengths, \$16 to \$17, gross ton; Relaying Rails, 56-lb. and upward, \$27 to \$28, gross ton; Iron Axles, \$25 to \$26, net ton; Car Wheels, \$17 to \$18, gross ton; Low Phosphorus, \$18 to \$19, gross ton.

New York.

NEW YORK, September 26, 1906.

Pig Iron.—The market has been acting somewhat spasmodically. For a few days it was quiet, but since the opening of this week a number of important inquiries have appeared, including both Foundry and Forge grades. These cover not alone deliveries for next year, but also for this year. For prompt Iron the market is on the basis of \$21.50 to \$22.50 for No. 2 Northern Foundry, tidewater, while for delivery during the first half of next year \$20.50 to \$20.75 is being asked. For Southern Iron the market is \$20 to \$20.50 for No. 2, this year's delivery, and \$19 to \$19.50 for delivery next year, New York.

Steel Rails.—The Erie Railroad has placed its order for 38,000 tons of Rails for 1907 delivery in the past week. Pending business is large and it is estimated that inquiries now before the mills amount to 150,000 to 200,000 tons, a considerable part of it for Southwestern roads. A new Cuban inquiry is for 22,000 tons for delivery next year. The United States Steel Products Export Company's bid of \$29.15, f.o.b. Baltimore, for 5000 tons of 70-lb. Rails, as already reported in these columns, has been accepted by the Isthmian Canal Commission, the Rails to be used on the Panama Canal. We continue the quotation of \$28 at Eastern mill for Standard Sections.

Structural Material.—Bridge work is being figured on for a number of railroads, and a considerable tonnage is expected to be booked in the remaining months of the year. In the past week the Central Railroad of New Jersey has let five bridges at Plainfield, N. J., amounting in all to 1000 tons of steel to the Pennsylvania Steel Company. The same road has other similar work ahead, which is expected to come out from time to time. The American Bridge Company's bookings for the month of September are expected to reach 60,000 tons, which is well up to the average for this year and a little more than equal to the present capacity of the company's plant. The amount of reaming required in

bridge work nowadays cuts outputs below what was possible when punched work was more generally accepted. The Palace Hotel contract, which contributed 4500 tons of the 5000 tons of San Francisco work taken by the American Bridge Company last week has now been increased to 5000 tons. The General Supply & Construction Company, New York, has undertaken the erection of the Battle Hotel at Mobile, Ala. The steel work amounts to about 1500 tons. The contract for the Brooklyn Academy of Music is expected to be let this week, calling for 2000 tons of Steel. Some foreign business is offered the erecting companies from month to month, and, notwithstanding the disturbed conditions in Cuba, several buildings, industrial and otherwise, are being figured on there. There seems no end yet to the amount of work pressing upon the erecting and fabricating companies, though some of them are showing more eagerness for whatever is going and are engaging their capacity some distance ahead at prices rather more sharply competitive than other firms consider to be called for under present conditions. Little or no foreign Shapes are being bought in this country, the prices abroad having advanced in recent months. One local contracting company has been importing Belgian Shapes in a moderate way for some time. We quote mill shipments for tidewater delivery as follows: Beams, Channels, Angles and Zees, 1.84½c.; Tees, 1.89½c.; Bulb Angles and Deck Beams, 1.99½c. On Beams 18 to 24 in. the extra is 0.10c. and on Angles over 6 in., 0.10c. Beams and Channels out of stock are sold at 2¼c. to 2½c.

Bars.—Quite unexpectedly an advance in Bolts and Nuts was made last week, amounting to about \$2 per ton. Although this might have been presumed to influence the price of Bar Iron the Eastern manufacturers decided not to change the official basis, which continues at 1.50c., Pittsburgh. Nobody appears to be taking orders at this price, but the market is firm at a minimum of 1.60c., Pittsburgh, or 1.74½c., tidewater. As far as can be ascertained none of the Eastern mills whose men are striking has yet started up, and the output is still restricted to that extent. The demand is strong both for Iron and Steel Bars. Manufacturers of Steel Bars quote 1.64½c., tidewater, for future delivery, but premiums are easily obtained on orders placed for reasonably early shipment.

Plates.—Conditions continue as set forth in these reports for several weeks. Orders are usually small, but the daily business entered aggregates a fairly satisfactory quantity, and some rather large tonnage is now under negotiation. Quotations are as follows at tidewater on mill shipments: Sheared Tank Plates, 1.74½c. to 1.84½c.; Flange Plates, 1.84½c. to 1.94½c.; Marine Plates, 2.14½c. to 2.24½c.; Fire Box Plates, 2.24½c. to 2.60c., according to specifications.

Cast Iron Pipe.—The buyer is fortunate who is able to find a foundry in position to promise deliveries of any size of Pipe before next February. Some excellent business has been taken for spring shipment, the buyers being gas companies. The United States Cast Iron Pipe & Foundry Company was the successful contestant for 1900 tons of Pipe on which bids were opened last Wednesday by the New York City Department of Water Supply, Gas and Electricity. The city of Philadelphia has placed with the same company a contract for 4800 tons of 60-in. Pipe. Carload lots of 6-in. are quoted at a minimum of \$32 per net ton, at tidewater, with February usually the earliest date named for delivery.

Old Material.—The market is active and strong. While its strength may be attributed in a considerable degree to the eagerness of dealers to anticipate expected market improvements, consumers who have been holding off to await more favorable opportunities are becoming convinced that they may have to wait too long and are covering their requirements. This has been particularly noticeable among consumers of Steel Scrap, who have taken good round lots the past week, and at full prices. The buying of consumers has also been in evidence in other lines. All kinds of Cast Scrap are still in strong demand, while Borings and Turnings are moving much more freely. A sale of Old Iron Rails has been made at \$24 on cars in this vicinity, which marks a sharp advance on previous transactions. The tendency of the whole market appears to be upward, notwithstanding the efforts of conservative dealers and consumers to keep it steady. Quotations for New York and vicinity are approximately as follows per gross ton:

Old Iron Rails	\$23.50 to \$24.00
Relaying Rails	27.00 to 28.00
Old Steel Rails, rerolling lengths	18.00 to 18.50
Old Steel Rails, short pieces	16.25 to 16.75
Heavy Melting Steel Scrap	16.25 to 16.75
Standard Hammered Iron Car Axles	27.50 to 28.00
Old Steel Car Axles	20.50 to 21.00
No. 1 Railroad Wrought	19.00 to 19.50
Iron Track Scrap	17.50 to 18.00
No. 1 Yard Wrought, long	17.50 to 18.00
No. 1 Yard Wrought, short	17.00 to 17.50
Wrought Pipe	13.50 to 14.00
Light Iron	9.50 to 10.00
Cast Borings	9.75 to 10.25
Wrought Turnings	12.50 to 13.00
Old Car Wheels	18.00 to 18.50

No. 1 Machinery Cast	16.00 to 16.50
Stove Plate	12.50 to 13.50
Grate Bars	11.50 to 12.00
Malleable Cast	16.00 to 16.50

Metal Market.

NEW YORK, September 26, 1906.

Pig Tin.—The inquiry during the week has been larger than for several weeks, although most of the business has been done by second hands within a narrow range. The low prices were made on Wednesday and Thursday at 39.95c.; the market then gradually advanced and on Tuesday sales were made at 40.40c. The price cutting goes on and London operators are not disposed to meet competition, believing they will have plenty of opportunities to sell their stocks at higher figures. The Banca sale of 1600 tons, which went at the average figure of 41.50c. c.i.f. New York, to-day, did not appear to influence the London market, which closed at £186 5s. for spot, an advance of 10s., and £185 10s. for futures. Tin could be purchased in the local market to-day at 40.40c. The arrivals so far this month are 3517 tons, and the floats 2645 tons.

Copper.—The long expected price of 20c. per lb. for Lake Ingot was reached early this week, when a car of Laké Ingot was sold at 20c. Several other cars were sold at the same price later. The scarcity for this year's deliveries is growing more acute every day. The general range of quotations for this year would be 19.75c. to 20c. for Lake, the outside price for spot and the inside price for December delivery. For the first three months of next year the range would probably be 19.50c. to 19.75c. For spot Electrolytic 19.87½c. is asked, while sales have been for December delivery made on a basis of 19.75c. For delivery during February of next year 19.25c. might possibly be done if the order included metal for delivery during March and April. We learn of sales of Electrolytic Copper for January at 19½c. to 19¾c. Casting Grades can be obtained at slightly lower figures than those quoted for Electrolytic. The scramble for Copper, for no other word adequately describes the situation, is as active in Europe as in America, although exports so far this month have been light, amounting to but 10,920 tons so far this month. This, however, need occasion no surprise either from producers or consumers of the metal, as the European takings are bound to be heavy during the next three months. The most reassuring feature of the entire situation is the fact that most of the metal is concentrated in strong hands, which are loath to have prices advanced too rapidly, and are exerting themselves to keep the metal out of the hands of speculators. Prices for retail lots are slightly, if anything, above those for carloads, but little metal can be obtained in cask lots. Holders of such lots are, however, limiting purchases to actual requirements. The European market is much firmer, spot and futures closing to-day at £90 7s. 6d. Best Select is held £2 higher than last week at £95 10s. It is interesting to note that the present price is the highest since 1882. Sales have been made in Europe this week at £94 10s., which is equivalent to 20.37½c., c.i.f. European ports. Manufacturers of Sheet Copper advanced the base price September 20 to a 24c. base.

Pig Lead.—The market is slightly easier, and shipments can be obtained at 5.95c., New York. In St. Louis we learn of nothing under 5.85c. The heavy consuming period will end within four to six weeks, so that lower prices can then be looked for. The London market is still very firm, at £18 10s.

Spelter.—The excitement of last week has passed away and the market is easier. It is now believed that the United States Steel Corporation only secured about 4000 tons, whereas its first inquiry was for 5000 tons. In St. Louis the market is quoted at 6.25c. In New York 6.35c. to 6.40c. would have to be paid for spot, while October and November shipments could be had at 6.30c. to 6.35c. The London market closes at £27 12s. 6d.

Antimony.—The market is flat and there is little inquiry, either for spot or future delivery. A fair range of quotations would be 25c. to 25.25c. for Cookson's, 24c. to 24.25c. for Hallett's, with other grades held at 22.75c. to 23.75c.

Aluminum.—The market continues firm, and deliveries are becoming more and more belated. We quote No. 1 Ingots at 36c.; No. 2 at 34c. per lb.

Ferroalloys.—There is a slightly better demand for Ferrosilicon and some importers have put up the price about 50c. per ton, quoting \$95 to \$96. For Ferrochrome, with 9 per cent. carbon, \$122 to \$125 is asked. It is stated that this is not in quite as heavy demand as a fortnight ago. Some sales of goodly amounts of Ferromanganese have been made on a basis of \$80, but small lots would command \$85. It is reported that slightly higher prices may be expected, as the market is bare of stocks. For 75 per cent. Ferrosilicon the price continues unchanged at \$150.

Nickel.—The price continues unchanged, at 45c. for large lots and 55c. to 65c. for smaller quantities.

Tin Plate.—The demand for Bright Plates continues to exceed the capacity of the mills. We learn on good authority that orders have been sent to Wales for Tin Plates for prompt delivery in this country to parties who have been disappointed in securing their supplies from the American mills. This of course indicates the premiums consumers are willing to pay for prompt deliveries, as the price in Swansea is 13s., equivalent to about \$4.75, c.i.f. Atlantic ports. There are other inquiries pending for foreign Plates. The price is very firm, and for 100-lb. IC Coke Plates we quote \$3.94, f.o.b. New York, or \$3.75, f.o.b. Pittsburgh, subject to the usual trade discounts.

Old Metals.—The demand continues to exceed the supply, and higher prices are the rule all along the line. Dealers' selling prices are as follows:

	Cents.
Copper, Heavy Cut and Crucible.....	18.75 to 19.00
Copper, Heavy and Wire.....	18.50 to 18.75
Copper, Light and Bottoms.....	16.75 to 17.00
Brass, Heavy.....	13.00 to 13.25
Brass, Light.....	10.50 to 10.75
Heavy Machine Composition.....	17.00 to 17.50
Clean Brass Turnings.....	11.75 to 12.00
Composition Turnings.....	14.00 to 14.50
Lead, Heavy.....	5.50
Tea Lead.....	5.25
Zinc Scrap.....	4.75

Iron and Industrial Stocks.

NEW YORK, September 26, 1906.

Fluctuations were not wide the past week, but prices were affected to some extent by higher interest on time money, and in the main a lower level of values prevailed than for the preceding week. The lowest prices were made on Saturday or in the morning session of Monday, after which an improvement occurred, from which a reaction took place on Tuesday afternoon attributed to the political developments in this State. The range of prices on the most active stocks was as follows from Thursday to Tuesday afternoon: Car & Foundry common 43 to 44½; Locomotive common 74½ to 76¼; Colorado Fuel 55¼ to 57½; Pressed Steel common 54¾ to 55¾; Railway Steel Spring 56¼ to 58¼; Republic common 37¼ to 39, preferred 99 to 99½; Sloss-Sheffield common 74½ to 75; Tennessee Coal 157½ to 159; Cast Iron Pipe common 47½ to 48; United States Steel common 44½ to 45½, preferred 106¼ to 107½. Last prices on active stocks up to 1.30 p.m. to-day were made at the following prices: Car & Foundry common 42¾, preferred 100½; Locomotive common 72¾, preferred 114; Steel Foundries common 11, preferred 44¼; Colorado Fuel 54; Pressed Steel common 53¾, preferred 98; Railway Spring common 55½; Republic common 36¾, preferred 98½; Sloss-Sheffield common 74¾; Tennessee Coal 159; United States Cast Iron Pipe common 47½, preferred 91¼; United States Steel common 44¾, preferred 106¾; Can common 6½, preferred 57½.

The Phoenix Iron Company, Phoenixville, Pa., has filed in Massachusetts its initial statement of financial condition, dated June 30, 1906, as follows:

Assets.	
Real estate.....	\$657,524
Machinery.....	3,378,136
Material.....	1,092,582
Cash and debts receivable.....	1,266,697
Total.....	\$6,394,939
Liabilities.	
Capital stock.....	\$1,500,000
Accounts payable.....	884,005
Funded debt.....	1,101,500
Profit and loss.....	2,909,433
Total.....	\$6,394,939

The Allis-Chalmers-Bullock, Limited, of Montreal, has authorized an increase of the capital stock from \$1,200,000 to \$2,500,000. Business is stated to have more than doubled during the past year, and the amount of unfilled orders is three times larger than a year ago. The proceeds of the new stock will be used to develop hydro-electric machinery and the Christensen air brake.

Dividends.—The Tennessee Coal, Iron & Railroad Company has declared a quarterly dividend of 1 per cent. on the common stock and 2 per cent. on the preferred stock.

The Westinghouse Electric & Mfg. Company has declared a quarterly dividend of 2½ per cent. on the preferred assenting and nonassenting stock, payable October 10.

The New York Air Brake Company has declared a quarterly dividend of 2 per cent., payable October 18.

The Rhode Island Perkins Horse Shoe Company has declared a regular quarterly dividend of 1¼ per cent. and an extra dividend of ½ per cent. on the preferred stock, payable October 15.

The Union Switch & Signal Company has declared a quarterly dividend of 2½ per cent. on the preferred stock and 2 per cent. on the common stock.

The Hall Signal Company has declared a quarterly dividend of 1¼ per cent. on the common stock and 1 per cent. on the preferred stock, the latter in addition to the annual

dividend of 6 per cent. declared in March and payable in four installments.

The E. W. Bliss Company has declared a quarterly dividend of 2½ per cent. on the common stock and 2 per cent. on the preferred stock, both payable October 1.

Pittsburgh.

PARK BUILDING, September 26, 1906.—(By Telegraph.)

Pig Iron.—There is little doing in the Pig Iron market in the matter of sales, as furnaces are sold up and are more concerned in making deliveries of the Iron they have sold than in getting new contracts. There have been sales the past week of possibly 3000 tons of Standard Bessemer at \$18.75 to \$19, Valley furnace, and there would be no trouble to-day in getting the latter price if the Iron could be had. A peculiar feature of the situation at present is that Malleable Bessemer has sold the past week as high as \$19.75, Valley furnace, for prompt delivery. About 3000 tons sold at this price and \$19.50. There is a moderate inquiry for Foundry Iron, one consumer being in the market for 1000 tons for prompt delivery. Northern No. 2 Foundry has been sold for October and November delivery at \$20.25 to \$20.50, Valley furnace, a sale of 300 tons having been made at the lower price. For delivery in the first quarter of next year Northern No. 2 Foundry is held at about \$18.50, Valley furnace. A local consumer has bought upward of 3000 tons of Southern Forge Iron on the basis of about \$13, Birmingham, equal to \$17.60, Pittsburgh. Northern Forge is held at about \$17, Valley furnace, or \$17.85, Pittsburgh.

Steel.—The supply of Steel continues very short, and Sheet and Tin Plate mills report that deliveries on Bars are very little if any better. We quote Bessemer Billets at about \$28, but note that a few stray lots are sold occasionally at less than that price. Open Hearth Billets are held at \$29 to \$30, and Axle Billets are held at \$34 to \$35, depending on carbon. Sheet and Tin Bars in long lengths for October delivery are held at \$30, Pittsburgh.

(By Mail.)

The principal events of the week were the advance of \$1 a ton in Wire products, effective September 20, and the placing of an order by the Pennsylvania Railroad for 12,400 Steel freight cars. Of this order the greater part went to the Pressed Steel Car Company, while the balance was divided between the Standard Steel Car Company and the Cambria Steel Company. As yet no inquiries for the material, which will amount to upward of 150,000 tons of plates and Shapes, have been received by the mills. The whole situation in the Iron and Steel trades continues as strong as it possibly could be, and the amount of tonnage that is coming into the mills on new contracts and on specifications is simply enormous. Little is doing in Pig Iron, as very little is to be had for delivery this side of January 1, while consumers are pretty well covered. A few small sales of Malleable Bessemer have been made in the past week at \$19, Valley furnace, and higher, while Basic has sold at \$18.75 at furnace. The shortage in supply of Steel is still being seriously felt, but it is expected that October will be a record breaker in the matter of tonnage turned out by the Steel mills, and it is hoped that by November the supply will be visibly better. The advance of \$1 a ton on Wire products is expected to be followed soon by an advance in Sheets and Tin Plate, and an announcement of this is expected at any time.

Ferromanganese.—The supply of Manganese Ores has become considerably better, and as a result prices on Ferro are somewhat lower. We quote 80 per cent. Ferro for prompt delivery at about \$80, while for forward delivery from \$75 to \$77 is quoted.

Wire Rods.—The demand for Rods continues larger than the supply, and prices are very firm. We continue to quote Bessemer Rods at \$34 to \$34.50 and Chain Rods made from Bessemer stock at \$33 Pittsburgh. Rods made from Open Hearth Steel are practically unobtainable and bring almost any prices that sellers care to ask.

Muck Bar.—The demand is better than for some time and prices are very firm. We quote best grades of Muck Bar, made from all Pig Iron, at \$30.50 to \$31, while Muck Bar made from part Scrap is held at \$27.50 to \$28, Pittsburgh.

Skelp.—Specifications on contracts are coming in freely and the mills are filled up with work for some time ahead. Prices are unchanged but very firm, and we quote: Grooved Steel Skelp, 1.57½c. to 1.60c.; Sheared Steel Skelp, 1.60c. to 1.65c.; Grooved Iron Skelp, 1.65c. to 1.70c.; Sheared Iron Skelp, 1.75c. to 1.80c., Pittsburgh, these prices being for ordinary widths and gauges.

Steel Rails.—No important orders for Steel Rails were taken by the Carnegie Steel Company the past week. In view of the heavy demand and the sold up condition of the mills, an advance in prices of Light Rails before long is expected. We continue to quote 16 to 20 lb. Sections at \$31, and 25 to 45 lb. Sections at \$30 at mill. Standard Sections remain at \$28 at mill.

Structural Material.—The Jobson-Hooker Company of this city has secured a contract for the erection of a large amount of Steel work for the new terminal depot of the Pennsylvania Railroad in New York City, and from 20,000 to 25,000 tons of Steel are involved in the contract. The order for this Steel was placed some time ago with Milliken Brothers of New York City, who will roll and fabricate it, while the erection work will be done by the Jobson-Hooker Company. We continue to report a great many small jobs being placed and which total a large tonnage. Prices continue very firm, and we quote: Beams and Channels, up to 15 in., 1.70c.; over 15 in., 1.80c.; Anglese, 3 x 2 x 1/4 in. thick up to 6 x 6 in., 1.70c.; 8 x 8 and 7 x 3 1/2 in., 1.80c.; Zees, 3-in. and larger, 1.70c.; Tees, 3-in. and larger, 1.75c. Under the Steel Bar card Angles, Channels and Tees under 3-in. are 1.60c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Plates.—As yet none of the material for the 12,400 Steel cars ordered by the Pennsylvania Railroad has been placed, and it may be some little time before this tonnage is given out, as delivery on the cars is not to start before April or later of next year. Specifications on contracts from the Steel car and shipbuilding interests are coming in very freely and shipments by the mills are heavy. None of the large Plate mills can promise deliveries on Universal Plates inside of four to six weeks, and on Sheared Plates from six weeks to two months. We quote: Tank Plates, 1/4 in. thick, 6 1/4 in. up to 100 in. in width, 1.60c., base, at mills, Pittsburgh. Extras over this price are as follows:

	Extra per 100 lb.
Gauges lighter than 1/4 in. to and including 3-16 in. Plates on thin edge.....	\$0.10
Gauges Nos. 7 and 8.....	.15
Gauge No. 9.....	.25
Plates over 100 to 110 in.....	.05
Plates over 110 to 115 in.....	.10
Plates over 115 to 120 in.....	.15
Plates over 120 to 125 in.....	.25
Plates over 125 to 130 in.....	.50
Plates over 130 in.....	1.00
All sketches (excepting straight taper Plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.).....	.10
Complete Circles.....	.10
Boiler and Flange Steel Plates.....	.10
"A. B. M. A." and ordinary Firebox Steel Plates.....	.20
Still Bottom Steel.....	.30
Marine Steel.....	.40
Shell Grade of Steel is abandoned.	

TERMS.—Net cash 30 days. For anticipated payments a maximum discount may be allowed at the rate of 6 per cent. per annum and for a longer time than 30 days interest shall be charged at the same rate per annum. Invoices paid within 10 days from date thereof, discount of 1/2 of 1 per cent. is allowable. Pacific Coast base, 1.60c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes 14 in. wide down to 6 in. of Tank, Ship or Bridge quality.

Sheets.—The mills are catching up to some extent on deliveries, but are still considerably behind. The trade generally expects that the advance of \$1 a ton on Wire products will soon be followed by a heavier advance on Black and Galvanized Sheets, but as yet there is no intimation from the American Sheet & Tin Plate Company that prices will be higher. New business in Sheets in September has not been as heavy as in August, but specifications on contracts continue to come in very freely. Prices are firm, and we quote: Nos. 17 to 21, 2.25c.; Nos. 22 to 24, 2.30c.; Nos. 25 and 26, 2.35c.; No. 27, 2.40c.; No. 28, 2.50c.; No. 29, 2.65c., and No. 30, 2.75c. We quote Galvanized Sheets as follows: Nos. 10 and 11, 2.45c.; Nos. 12 and 14, 2.55c.; Nos. 15 and 16, 2.55c.; Nos. 17 to 21, 2.80c.; Nos. 22 and 24, 2.95c.; Nos. 25 and 26, 3.15c.; No. 27, 3.35c.; No. 28, 3.55c.; No. 29, 3.80c., and No. 30, 4.05c. We quote No. 28 Gauge Painted Roofing Sheets at \$1.75 per square, and Galvanized Roofing Sheets, No. 28 gauge, \$3.10 per square for 2-in. corrugations. These prices are for carload lots, jobbers charging the usual advances for small lots from store.

Iron and Steel Bars.—The only two producers of Steel Bars that are now quoting 1.50c. are the Carnegie Steel Company and the Jones & Laughlin Steel Company, and they will book orders at this price only for indefinite delivery. The Cambria Steel Company, Crucible Steel Company and Republic Iron & Steel Company are holding Steel Bars at 1.60c., and have been doing so for some time, refusing absolutely to book orders at any lower price. New business in both Iron and Steel Bars continues fairly heavy, while specifications on contracts are being received in heavy volume and the mills are much behind in deliveries. We quote Steel Bars at 1.50c. to 1.60c., base, half extras, the higher price being for definite delivery. Iron Bars are held at 1.60c., Pittsburgh, and for prompt shipment as high as 1.70c. to 1.75c. is being paid.

Hoops and Bands.—Very little new business is being placed, the large consumers having placed their contracts some time ago, on which they are now specifying very freely. Prices are firm, but unchanged, and we quote: Steel Hoops, 1.90c. and Bands for all purposes at 1.50c., base, half extras, as per Standard Steel card. These prices are for carload lots, f.o.b. Pittsburgh, plus full tariff rail rate to point of delivery, an advance of \$2 a ton being charged for less than carloads.

Tin Plate.—The amount of new tonnage in Tin Plate that has been placed this month is fully as large as in August, and may be even heavier before the month is ended. The canning and packing interests are placing large contracts with the mills for delivery in last quarter and first quarter of next year, but the mills refuse to sell beyond the latter period. We are advised that this heavy tonnage has all been placed at the full official price, and in some cases slight premiums are being paid for prompt deliveries. We quote Tin Plate at \$3.75 per base box, f.o.b. Pittsburgh, for 14 x 20 100-lb. Cokes, terms 30 days, less 2 per cent. off for cash in 10 days, on which price a rebate of 5c. a box is allowed for carload and larger lots.

Railroad Spikes.—There is no let up in demand for Spikes, which is fully as heavy as at any time in the last two or three months. Some of the leading sellers are refusing to book orders except for delivery next year, being absolutely sold up for this year. We quote at \$2.40 to \$2.50 per 100 lb., the latter price being for reasonably prompt shipment.

Spelter.—Prices of Spelter have had a meteoric advance the past week, prime Western grades now being held at 6.25c., St. Louis, equal to 6.37 1/2c. Pittsburgh. The heavy purchases of the Steel Corporation and other large consumers in the past two or three weeks are responsible for the higher prices. It is predicted that Spelter will go still higher.

Merchant Pipe.—There is nothing new to report in the Pipe market. The demand continues abnormally heavy and the leading mills are filled up for practically the balance of this year. There is no change in prices and no indications as yet of a higher market. The extreme discount on Merchant sizes of Steel Pipe remains at 81 and 5 per cent. off, to the large trade. Official discounts for carloads, which continue to be shaded one point or more, are as follows:

Merchant Pipe.		Jobbers, carloads.			
		Steel.		Iron.	
	Black.	Galv.	Black.	Galv.	
1/2 and 3/4 in.....	.72	.66	.69	.53	
3/4 in.....	.74	.60	.71	.57	
1 in.....	.76	.64	.73	.61	
3/4 to 6 in.....	.80	.70	.77 1/2	.67 1/2	
7 to 12 in.....	.75	.60	.72 1/2	.57	
Extra strong, plain ends:					
1/2 to 3/4 in.....	.65	.53	.62	.50	
3/4 to 4 in.....	.72	.60	.69	.57	
4 1/2 to 8 in.....	.68	.56	.65	.53	
Double extra strong, plain ends:					
1/2 to 8 in.....	.61	.50	.58	.47	

Boiler Tubes.—Specifications on contracts placed with the mills by the large consumers early in the year are being received in good volume, while a fair amount of new tonnage is also being placed. Prices are being fairly well maintained, but are slightly shaded on some sizes for desirable tonnage. Discounts on carload lots are as follows:

Boiler Tubes.		Iron.	Steel.
1 to 1 1/2 in.....		.45	.50
1 1/2 to 2 1/4 in.....		.45	.62
2 1/4 in.....		.50	.64
2 1/4 to 5 in.....		.57	.70
6 to 18 in.....		.45	.62

Iron and Steel Scrap.—We note quite a heavy demand for Scrap, with the tone of the market very firm and indications pointing to higher prices on some lines of material. Dealers who have stocks of Heavy Steel Scrap anticipate that the market will be higher and have advanced their prices the past week. The very high prices and scarcity of Bessemer and Basic Pig Iron would indicate that demand for Steel Scrap will be active for some time, with high prices ruling. The market is firm and we quote per gross ton, f.o.b. Pittsburgh, as follows: Heavy Steel Melting Scrap, \$17.50; No. 1 Wrought Scrap, \$19.50 to \$20; Old Steel Rails, short pieces for Open Hearth use, \$17.50; Old Steel Rails, Rerollers, \$19 to \$19.50; Bundled Sheet Scrap, \$15.75 to \$16. Machinery Cast Scrap is in very active demand and has advanced from \$1.50 to \$2 in the past week. We quote it at \$18, at which price sales of considerable tonnage have been made. Cast Iron Borings are \$10.50; Wrought Turnings, \$13; Old Car Wheels, \$20 to \$20.50; Steel Axles, \$23, and Iron Axles, \$28 to \$28.50, all per gross ton, f.o.b. Pittsburgh. We note sales as follows: 2000 tons Heavy Steel Scrap, special specifications, at \$18.25; 1200 tons of Bundled Sheet Scrap at \$15.75, carrying a 40c. freight, and 2000 to 3000 tons of No. 1 Railroad Wrought Scrap at about \$19 net, f.o.b. Pittsburgh.

Coke.—The output of Coke in the Connellsville region continues to be curtailed by the famine in labor and car shortage. The trouble in getting cars is not due to shortage in supply, but delays have been occasioned by the new Hepburn rate law. This will be overcome in a short time and Coke will again move freely. Many Coke plants are so short of men that ovens cannot be drawn regularly. There is a heavy demand for Furnace Coke, which we quote at \$2.85 to \$2.90, and Foundry at \$3.25 to \$3.50. The total output of Coke last week in the Upper and Lower Connellsville regions was 387,737 tons, a slight decrease over the previous week.

Importers' Withdrawal Certificates.

WASHINGTON, D. C., September 25, 1906.—With a view to facilitating the securing of loans by importers on goods in customs bonded warehouses the Secretary of the Treasury has made an important modification of the regulations covering the transfer of withdrawal certificates. The subject has been under consideration in the Department for nearly a year and the regulations just issued represent much thought and care and are believed to be entirely satisfactory, not only to importers but also to the warehousemen at the leading ports.

Prior to 1893 the Treasury Department permitted importers to transfer the right to withdraw merchandise by a simple power of attorney with power of substitution. Under this system an importer was able both to transfer the right to withdraw goods and to retain the right, since he could at any time revoke the powers of attorney issued by him. The result was that the Department was often called upon to decide as to the ownership of goods between a number of applicants, and in some cases fraudulent transfers were made which resulted in the mulcting of certain financial institutions in very considerable sums.

Present Practice.

These abuses led in 1893 to the adoption of a drastic regulation abolishing the privilege of withdrawing goods under powers of attorney. As a substitute for the former procedure the new regulation provided that an importer might assign a withdrawal certificate to such person or persons as he might name therein, but that the assignee should have no power to make a further transfer of the withdrawal. Because of the extremely unsatisfactory condition that had arisen under the former practice the new regulation was regarded with great favor at the outset. Subsequently, however, as the business at the leading ports increased and the credit system expanded it was found that the new regulation worked a hardship. Banks were unwilling to lend money on withdrawals which could not legally be transferred to third parties. Importers found it inconvenient to assign withdrawals of an entire importation to secure a small loan, inasmuch as such transfer served to tie up all the goods in question. To obviate these difficulties many importers paid duties on their goods at much inconvenience to secure control of them as the basis for collateral loans.

Under the plan now decided upon an importer may transfer his right of withdrawal in whole or in part and the transferee may in turn assign it in whole or in part to third parties, and so on indefinitely. At the same time the system is so safeguarded that the right to withdraw any particular lot or part of a lot of merchandise will never be held by more than a single party. The regulation as promulgated by the Department provides as follows:

Text of Regulation.

Treasury decision 14,029 of May 22, 1893, provides that "Whenever an importer desires the delivery of his bonded merchandise to any other person than himself, he presents at the custom house a withdrawal, on which is noted in writing the following direction: 'I hereby authorize the delivery of the merchandise described in this withdrawal to _____,' whereupon proper note is made upon the warehouse bond ledger of the transfer and a delivery permit is issued in the name of the party designated by the importer."

If the importer does not wish to limit the right of withdrawal to one person he may leave the space for the name blank—i.e., make the authorization in blank. In that case the delivery permit should be issued without bearing either the signature of the customs officer or the name of the person to whom the transfer is made. By this means subsequent transfers may be made by delivery of the withdrawal and permit, without notation on the records of the custom house. The person paying the duties and charges must insert his name in the withdrawal; whereupon the delivery permit will be completed by the customs officer.

Upon surrender of the withdrawal and permit by any holder two or more withdrawals and permits, made out like the first, may be substituted therefor, so as to effect the withdrawal in accordance with section 2980 of the Revised Statutes of less than the entire quantity of merchandise deposited in the bonded warehouse.

The interest of the Government ceases with the payment of

duties and charges, and delivery of the merchandise thereupon rests with the warehouseman.

Section 2980 Revised Statutes referred to in the above regulation provides as follows:

No merchandise shall be withdrawn from any warehouse in which it may be deposited in a less quantity than in an entire package, bale, cask or box, unless in bulk; nor shall merchandise so imported in bulk be delivered, except in the whole quantity of each parcel, or in a quantity not less than 1 ton weight, unless by special authority of the Secretary of the Treasury.

Operation of New Rule.

Under the new system an importer desiring to borrow money on part of an importation may prepare a withdrawal describing the marks and numbers of the merchandise, and without filling in the name of the transferee may turn the document over to a bank or to an individual. The transferee upon presenting the withdrawal at the custom house may have it registered by the collector, such registration operating as a passing of title to the merchandise covered by the withdrawal and preventing the original importer from obtaining possession thereof. Should the merchandise be forfeited to the lender, his name may be written in the withdrawal and upon the completion of the delivery permit, as required by the regulations, and the payment of the duties, the importation passes into his possession.

The method of transferring the right to withdraw a part of an importation authorized by the new regulations is counted upon to prove of special value to importers. In practice a single consignment of goods may be divided into half a dozen lots, described by marks and numbers, and a separate withdrawal made and assigned for each lot. As these withdrawals are promptly registered by the transferees the goods covered thereby immediately pass from the control of the importer and the transferees' security is thereby fully protected. W. L. C.

The return of the lightning rod is the subject of an article in the *Electrical World*. While statistics show that lightning rod production and installation have fallen off very materially in the last few decades there are evidences of a judicious revival of the lightning rod, particularly in rural districts. The large use of steel building and of brick and stone in cities has lessened the chief danger from lightning, which is fire. Statistics collected by a leading fire insurance company covering the past 10 years show a steady increase in losses from this cause, over 80 per cent. of the estimated loss by fire to farm and country property being traced to lightning. Fire insurance companies expect, therefore, to advance rates on farm property not protected against lightning. The suggestion is made in the article that instead of a single copper rod the bird cage construction should be used—that is, 8 or 10 galvanized iron wires let down to ground level from the roof, all tied together at the top and at the bottom by horizontal wires.

Sanderson & Porter, engineers and contractors, 52 William street, New York, announce under date of September 15 that Richard S. Buck, consulting engineer of the Department of Bridges, New York City, has been admitted as a member of the firm. The partners in this firm now are Edwin N. Sanderson, H. Hobart Porter, Francis Blossom, Richmond Talbot and Richard S. Buck. The firm covers in its operations all lines of civil, mechanical and electric engineering, and now has under way 50,000 hp. of hydro-electric work in two developments on the Pacific Coast; the power house equipment and transmission system of the McCall Ferry Power Company, on the Susquehanna River; extensive additions to the New Orleans street railroad and lighting properties, and to those of the Mahoning & Shenango Railway & Light Company of Youngstown, Ohio, and New Castle, Pa.

The scholarly lecture on "The Early Use of Iron" delivered at Glasgow March 16, 1906, by Bennett H. Brough, secretary of the Iron and Steel Institute, before the West of Scotland Iron and Steel Institute, has been printed in pamphlet form by the Iron and Steel Institute, 28 Victoria street, S. W., London, England.

The Machinery Trade.

NEW YORK, September 26, 1906.

Some new projects were reported in the trade the past week which will necessitate the purchase of a considerable amount of machine tools. The tail end of some of the extensive lists were arranged for. These lists in most cases have been closed by purchases extending over several months, evidently in the endeavor on the part of the buyers to secure machines that could be delivered within a reasonable time. The tendency now more than ever is to buy piecemeal, picking up machines wherever they can be had. Steel car manufacturers have placed numerous orders with the important houses, no one concern receiving a large amount. With the almost unprecedented amount of orders on their books, and orders coming in daily in excess of their capacities a majority of the most important machinery dealers and manufacturers report the receipt of no orders for single lots aggregating a handsome sum. This steady influx of small and medium sized orders is taken in the trade as a sure sign that business is on a sound basis, which is likely to continue for some time. In the West the railroads have come into the market with large lists of machine tools, with the intention of placing early orders in order that the machines can be installed this winter. The lists of the Kansas City Southern Railroad, covering 50 tools, aggregating \$75,000, and Chicago, Milwaukee & St. Paul Railroad, covering 72 tools, amounting to \$100,000, are printed in detail in our Chicago Machinery Market.

Foreign business has improved to some extent, particularly from Europe. Russian houses are reported to have shown more activity, one of them having placed orders for considerable machinery for an automobile plant in Russia.

There seems to be a general movement on foot to advance prices on all classes of machine tools on which an increase has not already been made. Following the announcement in these columns last week of a 5 per cent. advance made by the leading manufacturer we are informed that other manufacturers have advanced prices 5 per cent. on lathes and drill presses.

Pennsylvania Railroad Machinery Requirements.

A notable feature of the inquiries issued by the Pennsylvania Railroad Company, through the purchasing department, is the request for prompt replies. Propositions are receiving quick attention, and what is wanted is wanted quickly. Among the recent inquiries is a proposition covering the furnishing and erecting of a conveyor system, preferably of the double chain and flight type, of not less than 50 tons capacity per hour, for elevating run-of-mine bituminous coal from a track hopper to a 50-ton capacity storage pocket, provided with one coaling gate and chute. The clearance and other dimensions are to be as indicated on the print which accompanies the inquiry. The bidder is to furnish complete designs of the structure and the conveyor system, the former to be of wood. Blue prints have also been forwarded to the crane manufacturers, with a request for a quotation on a 5-ton crane for a proposed bolt shop. The length of the crane runways will be 124 ft. 4½ in. long, and the clearances are shown in the cross sectional view of the shop shown on the print, the crane to be operated by means of a 220-volt direct current. The lifting speed under full load will be 60 ft. per minute, and the speed of crane along runways 600 ft. per minute. Bids have also been asked on a coal and ash conveyor to be installed in a power plant, of which blue prints are issued showing cross section of boiler room. The specifications state that bid should include a suitable coal crusher to be placed in the crusher pit, which is located at one end of the building. The Pennsylvania Railroad Company will install the coal and ash bins. The conveyor is to be motor driven.

The Southern Railroad is inquiring for more machinery, which is understood to be additional to that contained in the list which it sent out some time ago and which has been purchased. Part of the machinery for which it is receiving bids is for power equipment, and it is believed that there is considerable more machinery to follow the purchase of that for the power plant.

The Harrisburg & Ohio River Railroad has awarded a contract to D. E. Baxter & Co., Incorporated, 27 William street, New York, for the construction of a railroad line from Galatia, a point on the Illinois Central Railroad, to Rosi-Clair, on the Ohio River. The contract was awarded by T. Edwin Bell of Hammond, Ill., president of the road, and O. W. Ferguson of Harrisburg, Ill., as secretary. The line will be 38 miles long and will connect the Illinois Central Railroad with the Big Four at Harrisburg from a direct line to St. Louis, reducing the distance 175 miles and passing through the rich coal and zinc mine district of

southern Illinois. The line is to be of standard construction throughout, and it will include shops, roundhouses and everything that goes to make a first-class railroad system. The plans for the repair shops have not been prepared as yet, only in a preliminary way. G. S. Brantingham, who is manager of the construction department for D. E. Baxter & Co., returned this week from a tour of inspection, during which he went over the entire line of the proposed road. Work will be begun on the system as soon as possible.

The new car shop which the Intercolonial Railway of Canada, Moncton, N. B., is building will be 54 x 253 ft.

Things seem to be moving slowly with the equipment for the proposed power house of the New York, Westchester & Boston Railway Company, whose main offices are at 30 Broad street, New York, as the power plant machinery for which bids were called for several months ago has not been arranged for as yet. It has been definitely announced, however, by the company's engineers, that the equipment will be let in one contract and power men in the trade have been told that it has been practically decided as to who will get the contract. The site for the proposed power house has been selected, and it will be located at Mt. Vernon, near the Sound. The building will be 200 x 200 ft. and 80 ft. high. The company will also build its car repair plant at the same place, and the plans now being prepared call for sufficient equipment to keep up the repairs on about 200 cars. The trade can expect a list of requirements for the proposed car plant almost any day, as plans have developed sufficiently, it is understood, to give the engineers some idea as to the principal equipment that will be required.

New Car Plant for Canada.

The National Car Company, Limited, Halifax, Nova Scotia, has incorporated with a capital stock of \$1,000,000 and will construct a plant in that city for the building of both wood and steel cars. The plans for the buildings have not yet been completed, but owing to the large demand for cars in Canada, due to the extensive railroad building now going on, it is understood that the company will erect the plant as soon as possible in order that it may get a share of the business. John R. McLeod is secretary.

The De Loach Mill Mfg. Company, Atlanta, Ga., manufacturer of high grade mill machinery, which has been looking around for some time for a site for its proposed new plant, has selected 40 acres of ground at Bridgeport, Ala., overlooking the Tennessee River, on which is located the old United State Pipe Works. This plant, which consists of a good foundry building, 120 x 250 ft., costing about \$40,000, and a pattern shop, 40 x 100 ft., will be occupied. In addition the company will put up one or two buildings, including a blacksmith and machine shop, 100 x 600 ft., to be built entirely of concrete, including floor and roof. The new plant will represent an investment of about \$150,000, and will undoubtedly necessitate the purchase of considerable new machinery.

The General Electric Company has purchased the machinery specified in the list sent out in June and which aggregates in value about \$125,000. The greater portion of this machinery is required for equipping the new addition to the company's turbine manufacturing department at Schenectady, N. Y., which is about 150 x 800 ft., three stories high.

There are some inquiries in the market for equipment for the new plant of the Arthur Koppel Company, 68 Broad street, New York, and Berlin, at Homewood, Pa. The plant is designed for electrical railroad supplies and machinery, and it is understood that the inquiries now in the trade do not by any means cover the extensive machinery requirements, which are to be bought by Dodge & Day of Philadelphia, who are the engineers. Homewood is about 35 miles from Pittsburgh, and the Arthur Koppel Company has purchased an extensive tract of land there. The plans provide for a much larger plant than is now in course of construction, as it is the company's intention to hurry to completion a section of the erecting shop, the light car shop, switch shop, service building, office building and a part of the power plant. It is the intention to manufacture many of the products which have hitherto been imported from Germany, including a general line of railroad materials the company now deals in, consisting of various forms of freight cars, shop cars and like equipment. The trade can expect very shortly to hear of a long list of machinery requirements from this source, as it is understood that most of the equipment will be bought in the East.

There have been some inquiries in the trade from the Kennedy Valve Mfg. Company for equipment, which it is thought is to be installed in the new plant the company has in course of construction at Elmira, N. Y., and which will take the place of the company's plant now at Cossackie, N. Y. Contracts have been let for the buildings to be erected at present, which will include an iron foundry, 95 x 300 ft.; machine shop, 95 x 300 ft., and a pattern shop and pattern storage building, 50 x 300 ft. Plans call for other structures, including a brass machine shop, brass foundry, assembling, testing and tool departments, power house and smaller buildings. It is said in the trade that the full list of equipment needed for the plant is not out by any means,

but there have been inquiries for some of the principal machinery. The company will, of course, move a great deal of its equipment from Coxsackie, but that will by no means be adequate to equip the new plant. The company has arranged to equip the machine shop and foundry with 15-ton traveling cranes with 45-ft. span, and arrangements are being made to drive all the machinery by electric motors. There will be a power plant of about 400 hp. T. C. Flinn, superintendent of construction, is attending to all the machinery details and superintending the erection of the buildings. He has opened offices at 409-411 Realty Building, Elmira.

The machinery trades can undoubtedly look for some nice orders in the near future from the American Tobacco Company, which is to build five new buildings in Chicago to cost approximately \$1,000,000. The plans for the buildings are being prepared by Richard E. Schmidt, Chicago, but the machinery and power equipment will be purchased from the New York office. Specifications for the machinery have not yet been prepared, but the matter is in the hands of Mr. Francisco of the engineering department, whose headquarters are at 111 Fifth avenue, New York.

The directors of the American Can Company now have under consideration the rebuilding of its plant at St. Paul, Minn., which was recently destroyed by fire. While the company has machine shops at Chicago in which much of the machinery for the new plant will be built, it is likely that quite a little machinery will be purchased from the New York office.

There will be quite an amount of machinery, especially in the way of power plant equipment, required for equipping the new paper box factory which the H. Bridgeman Smith Company, 491 Kent avenue, Brooklyn, N. Y., is to erect. The building is to be 15 stories high, covering an entire block, and will be constructed entirely of concrete.

The Frevert Machinery Company, 18 Dey street, New York, has received a good sized order for machinery for export to Russia, to be installed in an automobile plant.

The Ridgway Dynamo & Engine Company, through McClave, Rimmer & Co., 95 Liberty street, its New York agents, has made the following sales: two 50-hp. engines for the plant of the Northern Street Railway Company, Scranton, Pa.; two 60-hp. engines, Wilkes-Barre City Hospital; one 125-hp. engine and 75-kw. generator, Dexter Folder Company, Pearl River, N. Y., and two generators and an engine for the Stuyvesant High School, New York City, to be used for experimental work.

Business Changes.

The Traylor Engineering Company, New York, has appointed the C. W. Knox Machinery Company, Denver, its exclusive representative for the sale in Colorado of its machinery for mining, sampling, milling, annealing and cyaniding, concentrating, smelting, rock crushing, cement making and fuel briquetting. The Cia Metalurgica De Juientla, S. A. of Mexico, has placed an order with the Traylor Engineering Company, through Victor Braschi & Co. of the City of Mexico, for a complete smelting plant, which will contain several new and interesting features.

The Latschaw Pressed Steel & Pulley Company, Pittsburgh, Pa., has appointed the Henry J. McCoy Company distributor of its products in New York, Charles E. Ring & Co., Brooklyn, and R. Gray, Jr., Incorporated, Newark, N. J., within the past 30 days.

The Konold Gas Engine & Supply Company, successor to the Konold Company, Pittsburgh, Pa., has moved from the Keystone Building to its new building at 208-210 First avenue, where it carries in stock a full and complete line of gas engines, motor boats, motor boat supplies and steam specialties.

The business of George C. Thomas, 26 Cortlandt street, New York, has been bought out by J. H. Cook, who has for the past 14 years been connected with the New Jersey Foundry & Machine Company. Mr. Cook has also bought a controlling interest in the G. & W. Mfg. Company, and he will carry on the business of Mr. Thomas, which is that of making and installing overhead traction systems, and especially iron work. Mr. Cook will continue the office at 26 Cortlandt street, and in the meantime Mr. Thomas will finish up several large contracts which he has on hand, and will then retire from the business. Mr. Cook has arranged to take with him in the new business a number of engineers who have been associated with him.

Catalogues Wanted.—The Elk Machinery & Supply Company, 1207-1209 Utah street, Seattle, Wash., desires catalogues from manufacturers of machinery, as it is open to represent companies not having agencies in its territory.

The Southern Export Company, New Orleans, La., has incorporated with a capital stock of \$50,000 to do a general export business, but primarily for the purpose of handling business connected with the construction of the Panama Canal. The company desires to receive from manufacturers catalogues and export price-lists. Frederick P. Morrill, Liverpool & London & Globe Building, is president; Nils Herlitz, vice-president, and Charles T. Baisley, secretary. These officers, with J. E. Bouden, constitute the Board of Directors.

Chicago Machinery Market.

CHICAGO, ILL., September 25, 1906.

Extensions and improvements to car, locomotive and repair shops continue to be projected by Western roads, and the additions all involve heavy purchases of machine tools and other equipment. The Kansas City Southern Railroad, through its engineers, has promulgated a list of 50 tools, which will cost approximately \$75,000, for installation in the addition to its locomotive department at Pittsburg, Kan., and specifications for pneumatic machinery are now being prepared and will be available shortly. The Chicago, Milwaukee & St. Paul Railroad is again in the market for equipment for its Milwaukee shops, the specifications as given in detail below being made up of 72 tools, and their purchase will represent an expenditure of over \$100,000. On a large part of this equipment shipments cannot possibly be made until the second quarter of next year, and purchases are now being made to insure favorable deliveries of next year's needs. Plans are now being prepared by the engineers of the Grand Trunk Railway for the erection of new shops at Battle Creek, Mich., but specifications of machinery requirements will not be available for several months. Announcement has just been made that the Big Four system will proceed with the erection of new shops near Indianapolis, Ind., reference to which has been previously made in these columns, and the improvements and extensions to the company's shops at Danville, Ill., will also be undertaken in the near future. The continued activity of the machinery trade in the West is largely attributed to the railroads whose purchases during the past few months have almost equalled the totals reached during the tremendous buying movement that characterized the closing months of last year. With the exception of the new steel plant of the Indiana Steel Company, Gary, Ind., no industrial operations of note are now projected or under way. An almost insatiable demand exists for individual tools, and on shipments from stocks dealers are asking premiums over list prices.

Kansas City Southern Railroad's Machine Tool List.

Improvements which will practically treble the capacity and facilities of its Pittsburg, Kan., shops have been undertaken by the Kansas City Southern Railroad. This entire undertaking, including engineering details and construction work, is in charge of Arnold & Co., Chicago, who in January last were awarded contract for engineering the proposition and in July began the construction. The car plant at Pittsburg is not being materially altered, the improvements being largely additions to the locomotive department. Included in the extensions is a machine and erecting shop, 152 x 356 ft. It will contain 16 vents having 22-ft. centers, 15 of which on the erecting shop side will be provided with engine pits, the sixteenth vent being set aside for general machinery repairs for the system. The capacity of the shop, which will be of brick and steel construction, will be 225 locomotives per year. The new power house will be 90 x 101 ft., and will be equipped with a 1000-hp. boiler, a 300-kw. and a 150-kw. generator, direct connected, and a 1500-ft. air compressor. A new locomotive coaling station is going into the plant, provided with a 10-ton locomotive coaling crane. The coal pocket will be 150 ft. long and will store about 150 tons of coal. In this installation are included an inspection pit 68 ft. long and two cinder pits, one long and one short, having a cinder pit capacity of four engines, divided into two units with turn-out between them. A new sandhouse will have storage capacity for 500 cu. yd. of wet sand, and will have a drying room, with two driers and crusher drum for blowing wet sand up into two sand columns. A 100,000-gal. steel water tank, 22 ft. high and provided with two 10-in. adjustable stand pipes, will also be erected. A 15-stall 90-ft. roundhouse, with 80-ft. turntable, is being built, and will be designed for future extension, giving an ultimate capacity of 42 stalls. The minor structures will include a new oilhouse of reinforced concrete construction, which will have a capacity of five 8000-gal. tanks and a storage space for waste materials, supplies, &c.; also a 46-ft. transfer table. Bids have been received on the power house equipment, crane for the coaling station, construction of the steel tank and several other propositions, although contracts have not yet been awarded. In general the tools which are now used in the existing plant will be utilized in the new shops, being removed to the various departments in line with the rearrangement. In addition to the old tools, the following approximate list of new tools will be required:

One 3300-lb. single frame steam hammer, one small post hammer, one bulldozer, one forging machine, one horizontal punch, one punch and shear, one power shear, one open throat power shear, one bevel shear, one staybolt nipper, one milling cutter grinder, five emery grinders, one drill grinder, one open side automatic surface grinder, one hy-

draulic wheel press, two die presses, one cold saw, one flue rattler, one flue welder, one 6-in. pipe machine, one nut facing machine, one triple head cutter, one 1½-in. staybolt cutter, one six-spindle nut tapper, one cinderling machine, one No. 2 universal milling machine, one horizontal boring mill, one 42-in. car wheel borer, one 42-in. double head boring mill, one 72-in. universal radial drill, two 24-in. drill presses, one 20-in. drill press, one two-spindle multiple drill, one six-spindle turret drill, one 48-in. triple geared engine lathe, one 26-in. double back geared engine lathe, one 20-in. double back geared engine lathe, one 16-in. double back geared engine lathe, one 36-in. brass turret lathe, one 2 x 26 in. turret lathe, two 16-in. brass turret lathes, one 22-in. engine lathe, one 18-in. engine lathe, one tool makers' lathe, three 12-in. bolt lathes, one double head axle lathe, one 79-in. driving wheel lathe, one crank pin lathe, two 42 x 42 in. by 16 ft. three-head planers, one 48 x 48 in. by 30 ft. three head planer, one 30 x 30 in. by 24 ft. planer, one 24 x 24 in. crank planer, one 22-in. double head traverse shaper and one 22-in. crank shaper. A big list of pneumatic machinery, including hoists as well as chain blocks, &c., will also be needed.

Machinery Requirements of Chicago, Milwaukee & St. Paul Railroad.

Further heavy installations of machinery and equipment are to be made in the Milwaukee shops of the Chicago, Milwaukee & St. Paul Railroad, and the specifications which have just been issued by John T. Crocker, general purchasing agent, Chicago, cover approximately \$100,000 worth of tools. The issuance of this list immediately after awards were made for equipment costing \$60,000 indicates the extensive improvements that are under way and the precautions that are being taken to cover requirements well through the first half of next year, as it is certain that builders will not be able to make shipments of many types until after April or May. The list, which includes 7 slotters, 10 planers, 9 lathes, 6 drills, 4 shapers, 5 boring mills, 3 grinders, 3 shears, 2 staybolt machines, 12 drill presses, 10 hammers and 1 forging machine, follows:

One three-head slotter, with three motors to drive independently, for frames; one 24-in. slotter, motor drive, for driving boxes, driving wheels and mud rings; two 18-in. slotters, one to be motor driven for cross heads, cross braces, frame tongue, steam chests, guides and main rods; two 16-in. slotters for side rods, transmission rods, links on outside motion hanger and rod straps; one 12-in. slotter for reverse lever quadrants, links inside reverse lever latches, link blocks, main rod keys, brass spanner nuts and valve rod sockets; one planer, 84 x 84 in. by 14 ft., motor drive, for cylinders; one planer, 7 x 36 ft., motor drive, for frames; one planer, 48 x 48 in. by 16 ft., motor drive, for main rods, truck bars, truck centers and driving boxes; one planer, 42 x 42 in. by 10 ft., for guides, motor drive; three planers, 36 x 36 in. by 10 ft., for cross heads, mud rings, steam chest, expansion plates, eccentrics and eccentric straps; one planer, 36 x 36 in. by 10 ft., for filling blocks, diamond centers and cross head liners; one planer, 36 x 36 in. by 8 ft., for link hangers, saddles and links; one planer, 24 x 24 in. by 6 ft., for shoes and wedges; one lathe, 36 in. by 6 ft., for piston work; one lathe, 24 in. by 6 ft., for piston valve and rod work; one lathe, 22 in. by 6 ft., for motion work; one lathe, 28 in. by 8 ft., for general work; one lathe, 28 in. by 7 ft., for general work; one lathe, 24 in. by 7 ft. 6 in., for driver axles; one double headed lathe for tender axles; two lathes, 3 x 36 in. for new bolt fittings; one five-spindle drill, with five motors to run independently, for frames; one 6-ft. arm radial drill for cylinders, transoms, front and back deck; four four-spindle drill presses, one to be motor driven, for bridge castings, tongues, driving boxes, guide yoke plates; one 42-in. table single spindle drill press, No. 5 Morse taper socket; four 36-in. table drill presses for general drilling, four 22-in. table drill presses for general drilling, three double head shapers for rod work, driving box collars, brasses, cross head liners, gibbs, truck collars and guide blocks; one 12 or 14 in. stroke single head shaper for general work, one 72-in. boring mill for driving wheels, engine truck center, center front and ring and flue sheet; two 60-in. boring mills for front and back cylinders, head spiders, steel dome rings, dome ring casing top and bottom dome covering, sand boxes, top and bottom smoke stack, saddle eccentric and straps front and doors; one 30-in. boring mill for rod brasses, valve bell rings, steel followers for valves; one large slab milling machine, with vertical and horizontal spindle, motor driven, No. 5; one grinder for guides, two 36-in. grinders for tools, one 48-in. combined punch and shear for boiler and tank work, one angle iron shear, capacity 6 x 6 x ½ in., for cutting angle iron and round iron up to 1½ in.; one Ferguson's flue furnace for welding frames, one modern staybolt machine, with lead screw to cut 36 in., for threading staybolts; one modern staybolt machine, with lead screw, for threading radial stays; one six-spindle drill press, 23 in. between table and head, motor driven, for mud rings and boiler work; one 25-in. drill press for small work, drilling patches and countersinking; one 12-ft. arm wall radial drill, lever feed, for countersinking reaming staybolt holes and boiler plates; two 5000-lb. double frame steam hammers, three 3000-lb.

double frame steam hammers, two 1600-lb. long stroke single frame steam hammers, one 2000-lb. long stroke double frame steam hammer, two 100-lb. Bradley cushion hammers for general work, one 2½-in. forging machine, motor driven, continuous motion side shearing attachment, for general work.

The Anti-Friction Spiral Bearing Mfg. Company, Hannibal, Mo., recently organized and whose plant was removed a short time ago from Wichita, Kan., is making rapid progress in the erection of a new plant at Hannibal, the buildings being nearly ready for the roofs. The foundry building will have an area of 9000 sq. ft., and just south of this structure will be erected the machine shops, storerooms and other smaller buildings, with an area in square feet of 27,500. The buildings are being constructed of cement, and will be completed and ready for operation inside of two months. The officers of the company are A. S. Nelson, president and general manager; Chester A. Latham, vice-president and assistant general manager; Elsberry Martin, treasurer; G. L. Pinkham, secretary and auditor; W. A. Ayres, attorney, and Frank L. Fonda, mechanical engineer. The anti-friction spiral bearings which the company will manufacture are the invention of Chester A. Latham, the assistant general manager.

The Mason Wrench & Tool Company, Chicago, has just been incorporated, with a capital stock of \$12,000, and will manufacture a general line of tools and railway appliances, making a specialty of a new patent wrench. A plant will be erected at Harvey, Ill., comprising a main building and a power house, the former having dimensions approximately 75 x 100 ft. Some of the drop forge equipment has already been contracted for, but the bulk of the equipment, including that for the power house, is yet to be placed. At present the company is having its product manufactured, for convenience of distribution, at factories at Momence, Ill., Cleveland, Ohio, and Newark, N. J. The general office is located at 1431 First National Bank Building, Chicago. The following are the officers of the company: H. W. Mason, president; G. H. Deeves, vice-president; F. W. Glen, secretary, and J. D. Wineow, treasurer.

J. A. Prescott Machinery Company, St. Louis, Mo., has been incorporated with a capital stock of \$10,000. The company acts as distributing agent in Southern territory for the Jeansville Iron Works Company, George D. Whitcomb Company, Blaisdell Machinery Company, C. T. Carnahan Mfg. Company, Thomas H. Dallett Company, Canton Pump Company, Dayton Pneumatic Tool Company and the Ottumwa Iron Works. Incorporators of the company are J. A. Prescott, Atwood Fenton and George P. Reynolds.

The machinery requirements of the Western Glucose Company, Chicago, will include a 1500-hp. engine, from 2500 to 3000 hp. in boilers, together with considerable electrical equipment, transmission machinery, pumps, steam water piping, &c. As previously stated in these columns, this company, whose office is located in the Postal Telegraph Building, was recently incorporated and will build a large glucose plant at Roby, Ind., plans for which are being prepared by P. L. Saenger, general superintendent of the company. The plant will comprise approximately 10 buildings, 60 to 125 ft. wide, 80 to 100 ft. long and 60 to 125 ft. in height, two and three story and one or two six-story. The buildings will be of fireproof construction—steel, brick and concrete—with concrete foundations. They will have gravel roofs, steam heat, electric light and all the latest improvements. The plans and specifications for the buildings will be ready in about 30 days.

Joseph T. Ryerson & Son, Chicago, report recent heavy sales of punches and shears, including several large installations for railroad shops, several large Lennox rotary bevel shears having been purchased by the New York, New Haven & Hartford, while punch and shear equipment has been sold to Swift & Co., Chicago, and the Pittsburgh Steel Construction Company, Pittsburgh. Sales of the Ryerson flue cleaner have been made to the following roads: New York Central, New York, New Haven & Hartford and the Pennsylvania.

Activity in mining operations is leading to large shipments of machinery into mining districts. The Power & Mining Machinery Company, Cudahy, Wis., has recently booked heavy orders for this class of machinery, among the sales made being the following: Twenty-four sets of 36 x 16 in. crushing rolls and four sets of 54 x 26 in. crushing rolls for the Utah Copper Company, Garfield, Utah; three additional converter stands and nine shells, Detroit plant of the Copper Queen Consolidated Mining Company at Morenci, Ariz.; 11 6-ft. Chilean mills, Real del Monte y Pachuca, Pachuca, Mexico; six 6-ft. Chilean mills, Golden Cycle Mining Company, Colorado City, Colo.; 60 agitators, United State Mining Company, Salt Lake City; three 48 x 240 in. water jacketed copper furnaces, British Columbia Copper Company, Greenwood, B. C.; three 56 x 240 in. water jacketed copper furnaces, Balak Consolidated Mining Company, Redding, Cal.; two 46 x 162 in. copper and lead furnaces, Oaxaca Smelting & Refining Company, Oaxaca, Mexico; one 56 x 180 in. water jacketed copper furnace, Arizona Smelting Company, Humbolt, Ariz.; two converter stands, electrically driven, and four shells, 96 x 108 in., as well as five 10-ton matter ladles, Selby Smelting & Lead Company, South San Francisco; four converter shells, 84 x 126 in.,

Colusa Parrott Mining & Smelting Company, Butte, Mont.; two converter shells, 84 x 126 in., Shannon Copper Company, Clifton, Ariz.

Municipal Work.

The city of Chicago will greatly extend its facilities for better water supply within the next two years. A large appropriation has already been made for the work, which, when the tunnels, cribs, &c., have been completed, will have cost between \$5,000,000 and \$6,000,000. Three new pumping stations will be erected, and the present Lake View station will be improved in capacity to equal the three large new ones. One of the new plants will be located at 104th street and Stewart avenue, one in the vicinity of Forty-ninth street and Western avenue and the third at South Chicago. Land upon which the plants at Forty-ninth street and Western avenue and South Chicago will be built has not yet been secured. Each station will have a capacity of 100,000,000 gal. in 24 hr., furnished by four 25,000,000 triple expansion engines. The Lake View station, which now has a capacity of approximately 50,000,000 gal. every 24 hr., will be enlarged and additional units will be installed, giving this plant a capacity of 100,000,000 gal. The work will necessitate the building of 18 miles of water tunnel, ranging from 14 in. to 7 ft. in diameter. Up to this time consideration has only been given to the engines for the new stations, but the boiler and other equipment requirements will be heavy and will be undertaken in the near future. Extensive improvements are now being prosecuted to existing plants, consisting largely of additions of boiler units. Four 250-hp. internally fired boilers are being placed in the Lake View pumping station to displace old ones, the contract having been awarded to John O'Neill, Chicago, for this work. Two Stirling boilers of 340 hp. capacity each are being installed in the Harrison street station, and four of the same type and size are being placed in the Sixtieth street station.

The city of Bloomington, Ill., is in the market for three 250-hp. water tube boilers, complete with all appurtenances. This equipment will supplant five old boilers in the city water and light plant.

The Hicks Locomotive & Car Works, Chicago, Ill., has moved its general offices to the seventeenth floor of the Fisher Building.

Philadelphia Machinery Market.

PHILADELPHIA, PA., September 25, 1906.

Manufacturers as well as merchants have sent out a large number of quotations for machinery and tools during the past week, covering specifications for all classes of equipment, but as a rule for small quantities individually. The actual business closed, however, during the same period was not very large; orders were rather scarce, and such business as was closed was almost entirely for single tools.

Manufacturers in many cases are not adverse to a let up in the demand. They have been so crowded with business the past year that a cessation of orders for a few weeks, or as some have stated for a month, would enable them to get a breathing spell and give them a chance to see where they stand. As it is, the day to day orders are of sufficient quantity to cover practically almost the daily output of the plants, and therefore make it impossible to catch up to any extent on the present long delayed deliveries. This condition has its unfavorable influence on the placing of new business, not a small amount being held up on account of the uncertain delivery. It is practically impossible on the part of the small buyers to place orders for tools which cannot be furnished by manufacturers for periods varying from six to ten months, as it is more or less uncertain on the part of many buyers as to what their business conditions will be at that time. With those requiring extended equipment for the installation of new plants or for large extensions, conditions are different, but at this time the demand for such equipment, particularly in this territory, is not very large.

Inquiries are particularly good but confined largely to minor equipment and tools for replacement, and where it is possible to supply the sizes desired from dealers' floors, or on reasonably good deliveries from makers, there is little difficulty in closing the business. The demand covers the full line of tools fairly well, those of the medium sizes being probably the most inquired for, although there has also been some good inquiry recently for some lines of the heavier tools.

The export demand for special tools continues to improve, and makers of those lines have taken on quite an increased volume of business. The trade in file cutting machinery, heavy special cold sawing machines and special crank shaft lathes has increased considerably of late, and several good shipments for export have been made. Export business in the standard lines of machine tools continues inactive. The same conditions prevail which have dominated this trade

heretofore, and until makers are better able to take care of the home demand there is little prospect of much activity in the foreign business.

The demand for second hand machine tools continues quite active. In several instances extensions to plants are being made almost entirely of second hand tools, it being impossible for the buyers to wait for deliveries of new tools. Good sales are reported by the dealers in this class of machinery, and it is found difficult in some cases to keep up stocks of the more desirable tools and their various sizes.

Boilers and engines are in better demand. Some fair sales have been made and the outlook for the fall trade is encouraging. Second hand boiler and engine sales have also improved, but this trade is not as active as dealers would like to see.

There is a continued good demand for both iron and steel castings. Steel casting plants are booking contracts for next year's delivery, and has as much business on hand for this year's delivery as they can well take care of. Gray iron castings are hard to get promptly, although foundries are operating at their best capacity, and deliveries of machinery castings are in some instances more or less delayed.

The Baldwin Locomotive Works has decided to transfer its brass casting department from its local plant to its recently acquired plant at Eddystone, Pa. A new building, 60 x 400 ft., is to be erected for this purpose. Several very large orders for locomotives, in addition to those mentioned recently in these columns, have been booked, and work enough is on hand to keep continuously busy at full capacity for many months.

The Tindel-Morris Company, Eddystone, Pa., is running double turn in its machinery shop in order to meet the demand for its various lines of special machine tools. Tindel-Albrecht crank shaft lathes have been in particularly good demand, both for foreign and domestic account. Five crank shaft lathes, several 17 and the remainder 12-in. sizes, were shipped last week to Germany and Italy. Three of these machines have also been shipped to domestic automobile builders, and one has been furnished a large electrical works. The outlook for business is reported particularly good, inquiries are numerous and there has been little difficulty experienced in closing up orders.

The High Duty Saw & Tool Company, Eddystone, Pa., reports extensive sales of Tindel high duty saw blades, which are now being made in sizes from 18 to 52 in. in diameter. This company has also increased its line of Paragon high duty cold sawing machines, so that four sizes are being made to take in the varying sizes of saw blades. A large number of orders for blades as well as machines are on the books, and every department of the plant is being operated at full capacity. Among recent deliveries by this company was a large double rotary slotting machine of a new type to a large forging plant in Germany.

The Hess Machine Works reports an increased demand for file making machinery from both foreign and domestic sources, particularly the latter, and a very satisfactory volume of business has been closed. A large number of machines for export to England and Germany are in course of construction, while three sets have just been shipped to France. In the domestic field deliveries of five sets of machines to parties in Ohio, and a set of machines to customers in Newark, N. J.; Boston, Mass., and Middletown, N. Y., are noted.

The Philadelphia Roll & Machine Company continues to receive orders for a large tonnage of both cupola and air furnace charcoal iron castings. These include both sand cast and chilled rolls, ranging from 5 to 10 tons in weight for all classes of work, heavy engine beds and fly wheels and special machinery castings. An order for an 18-in. three-high mill for the Riverside Metal Company, Riverside, N. J., has also been received, while a heavy 24-in. two-high mill has just been completed for the same company. Heavy cast and chilled rolls are continually being shipped by this company to many of the large iron and steel mills in various parts of the country.

The Espen-Lucas Machine Works has booked a large number of orders for various machine tools, particularly those of the heavier types, and is fully occupied in all departments. Inquiries are in good number, and but little difficulty is experienced in closing up prospective business. This company has recently shipped two heavy, double blade crank shaft cold sawing machines, each weighing 20,000 lb., to a customer in New Jersey, and another of the same size to New York parties. A crank shaft finishing machine has also been supplied a Pennsylvania concern, while steel foundry, I-beam and bar cold sawing machines have been shipped to nearby customers as well as others in New England, the South and the Middle West.

The electric railroad built by the Pennsylvania Railroad Company between Camden, N. J. and Atlantic City was opened to the general public September 18. The trains, consisting of three cars each, are scheduled to make the run of nearly 60 miles in 90 minutes.

New England Machinery Market.

WORCESTER, MASS., September 25, 1906.

The advance in price of planers and lathes has not affected the demand for these classes of tools. Manufacturers had expected there would be some slight let-up in business because of the additional figure at which their tools are listed, but if anything the contrary is true. One meets with what is almost disappointment among the machine tool builders that the demand continues as strong as it does. Foreign business is maintained on a level of healthful conditions, supplementing the unprecedented domestic demand.

The advance in prices of lathes has become practically universal. Every large lathe builder in New England has put up prices 5 per cent., one following the other, and the word comes from the West and other sections of the country that a similar advance has been made. In a few instances the increase was made several weeks in advance of the majority of the trade.

The hand milling machine manufacturers have started an upward trend in prices. The Chicago Machine Tool Company, Chicago, has notified its agents of a 10 per cent. increase on hand millers, and it is expected that other manufacturers will follow the example. This is the first advance that has been made on this class of machine tool.

There is a strong feeling among builders of sensitive drills that an advance should be made in their product, especially in certain sizes, notably among them the plain single spindle machine. The reason that prices have not been advanced is that certain of the manufacturers decline to change their schedules, and the others hesitate to give to these competitors the advantage which accrues from lower prices. This brings up the argument that in a market such as this it would make no difference to the machine tool builder who might decide to increase his prices if his competitors should decline to follow his example. As one prominent machine tool builder argues it out, taking this extreme case instead of that of a group of manufacturers, the single manufacturer would at the start lose business, while his competitors would increase theirs. The first batch of orders following his advance would not go to him, because of his higher prices, his works would ease up and would catch up with deliveries, or at any rate get in a much better position for furnishing machinery at an early date. His competitors, on the other hand, would be getting farther and farther behind on their orders, until the time would come when the ability to make early shipments would more than counterbalance higher prices. The competitors would at last be compelled to raise prices, or at any rate they would see that there was nothing to be gained by keeping them at the old figures. The new condition would arrive all the earlier if a group of manufacturers should act together in changing prices, leaving a few competitors to maintain the lower prices. This is quite likely what would happen if some few of the sensitive drill builders should advance prices regardless of the rest of their trade. Under present business conditions they would doubtless have all they wanted to do at the new figures, and in the long run would make more money than those competitors who persisted in remaining at old schedules.

Some of the machinery dealers have received the very unpleasant information during the past week that their shares in the equipment of the locomotive repair shops of the New York, New Haven & Hartford Railroad, Readville, Mass., have been very materially curtailed. They had been led to believe that they would come in for satisfactory slices of the big list; they even received lists of the tools which they had been chosen to furnish. But something happened, no one knows what, and the individual lists have been greatly reduced, down to what looks to be practically nothing, as compared to what had been expected. It is understood that the great bulk of the contracts has gone to one New York dealer, a contingency which had been feared from the beginning until a fortnight ago when tips went out of the distribution of the list among the larger dealers.

The Brewery Appliance Company, Hartford, Conn., is to erect a factory building on Windsor street, in that city, to be 34 x 50 ft. and three stories. The company is in the market for a considerable amount of equipment, including milling machine, planers, drill presses, grinding machines, wood planer, dynamo for lighting purposes, gas engine, boiler for heating and shafting and hangers.

The American Writing Paper Company is to build a large plant at Holyoke, Mass., at a cost of \$700,000. The works will include a power house, in which from 1800 to 2000 hp. will be developed. Water power will be employed, but there will also be a complete steam plant, engine and boilers, capable of providing the entire works with power. Electric power will be used to a great extent, it is understood.

Shippers are much interested in the announcement that

the Enterprise Steamship Company, which operates a line of steamers in competition with the New York, New Haven & Hartford lines, between New York and New England ports on the Sound, is to extend its service, the capital stock having been increased for the purpose from \$750,000 to \$1,750,000, much of the new money having been furnished by the Duponts of Wilmington, Del. Pier 10, East River, has been leased, and orders will be placed for two new steamers. The lack of competition has affected freight rates, it is claimed by the shippers, and the presence of aggressive competitors is looked to with pleasurable anticipation.

The New York, New Haven & Hartford Railroad is to largely increase the capacity of its power plant at Berlin, Conn., to furnish power for the line between Middletown and Berlin, which has been converted from steam to electricity.

There has been a change in the Board of Officers of the Dwight Slate Machine Company, Hartford, Conn., manufacturer of sensitive drills, automatic gear cutters and special machinery, on account of the death of Dwight Slate. H. N. Hinckley has been made president of the corporation, succeeding Mr. Slate. H. B. Slate succeeds Mr. Hinckley as secretary and treasurer, and C. B. Elmore continues in his capacity of treasurer.

The Nichols & Longworthy Machine Company, Hope Valley, R. I., has let the contract for additions to its works, which have been mentioned in this column. The larger of two buildings will constitute an extension of the boiler shop and will be devoted to the manufacture of Worthington water tube sectional boilers, while the smaller building will be an experimental shop, for use in the development of a five-cylinder self-starting gasoline engine which will be manufactured under the Dock patents. All new machinery equipment has been arranged for.

The Massachusetts Ball & Machine Company, Chicopee, Mass., has been organized, with a capital stock of \$15,000, of which \$6000 will be issued at once, and will manufacture the small steel balls used as bearings of typewriters, which up to the present time have been imported from Germany. A factory has been leased at Gilmore and Cross streets, Chicopee. The company will be in the market for one or two lathes and a shaper. The officers are: President and treasurer, Emerson G. Gaylord; clerk, J. P. Canty; directors, Charles A. Ludden, Emerson G. Gaylord, J. M. Grise, Thomas M. Byrnes and P. J. Rourke. The balls will be manufactured under a process invented by J. M. Byrnes.

Cincinnati Machinery Market.

CINCINNATI, OHIO, September 25, 1906.

Builders of machine tools are still crowded with work. In fact, orders are coming in more rapidly than the finished product can be turned out, which consequently makes deliveries farther behind than ever. The labor situation, while quiet, is very unsatisfactory, in that the demand for additional skilled workmen is on the increase, with applicants apparently indifferent and limited in number. It is thought, however, that as the weather becomes more inclement and winter approaches a large number of men who during the summer months find it more remunerative and pleasant to work out of doors, will return to their trade and seek employment in the various shops.

Quite a number of the plants are making arrangements for added space, hoping thereby to be able to handle more trade with increased facilities.

During the past few weeks a number of inquiries have been received from Japanese agents, and it is understood that some machines are now being built for this trade. During the recent war between Japan and Russia it will be remembered that the former country several times depleted the stocks of the Cincinnati machine tool builders, and as there appears to be another wave of activity in progress manufacturers are anticipating further interesting developments.

The Cincinnati Punch & Shear Company reports two large tools about ready for shipment to Japan. Prices generally have been advanced from 5 to 10 per cent., according to the size and weight of the tool. Great difficulty is being experienced in securing the requisite number of workmen, which is greatly retarding the output of the plant. Additional floor space is in urgent demand, which contingency can only be met by rearranging the present shop equipment, as no more available space can be secured.

The D. T. Williams Valve Company, which recently purchased a new site on Hunt street, expecting to erect a plant, has changed its plans somewhat and will remodel a large building that now occupies the space, and by so doing save a large amount of time and money.

The Administrative Council of the National Metal Trades Association, of which W. D. Sayle of Cleveland is president, will meet in the offices of the association in the Union Trust Building on October 16 and 17. A number of very important subjects will come up for action at this meeting.

among which will be the rearrangement of several of the districts in the East, made necessary by the large increase in membership the past year. From reports received a full attendance is expected. Robert Wuest, secretary and acting commissioner, is making his headquarters for the time being at Toledo, Ohio, where he is taking personal charge of the strike now being waged against the Pope Motor Company. Men have been sent from different sections of the country and most of the places of the strikers are now filled.

Government Purchases.

WASHINGTON, D. C., September 25, 1906.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until October 30 for the following machine tools for the Mare Island Navy Yard: Schedule 161, one toolroom lathe; schedule 162, one electric overhead traveling crane.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until October 2 for small machine tools and other supplies for the Eastern navy yards.

As the bids received on August 4 for boilers, condensers, economizers and other supplies for the power plant at the Norfolk Navy Yard were not considered satisfactory, these articles will be readvertised shortly. The contract for the electrical machinery has been awarded to the Westinghouse Electric & Mfg. Company, Pittsburgh, Pa.

The following bids for supplies for the navy yards were opened September 18:

Bidder 19, George F. Blake Mfg. Company, New York; 62, M. T. Davidson, Brooklyn, N. Y.; 152, J. Edward Ogden Company, New York; 181, P. H. & F. M. Roots, New York; 186, B. F. Sturtevant Company, Hyde Park, Mass.; 244, F. S. Banks & Co., New York.

Class 18. One air pressure blower—Bidder 181, \$2305; 186, \$2589.45.

Class 280. Two steam pumps—Bidder 19, \$100; 62, \$95; 152, \$170; 244, \$700.

The following bids for machinery for the Isthmian Canal Commission were received September 14, Circular No. 326:

Bidder 23, Drew Machinery Agency, Manchester, N. H.; 28, R. W. Geldart, New York; 33, Handlan-Buck Mfg. Company, St. Louis, Mo.; 41, Landis Machine Company, Waynesboro, Pa.; 42, Landis Tool Company, Waynesboro, Pa.; 46, Manhattan Supply Company, New York; 47, Manning, Maxwell & Moore, New York; 52, Motley, Green & Co., New York; 54, Niles-Bement-Pond Company, New York; 56, S. Obermayer Company, Cincinnati, Ohio; 58, Oliver Machinery Company, New York; 62, Prentiss Tool & Supply Company, New York; 64, Quincy-Manchester-Sargent Company, Plainfield, N. J.; 68, Sherman-Brown-Clements Company, New York; 85, Vandyck-Churchill Company, New York; 86, Vermilye & Power, New York; 90, Ricketts Engineering Company, Washington, D. C.; 95, Gamwell & Wheeler, Seattle, Wash., delivery at La Boca; 96, F. S. Banks & Co., New York.

Class 1. One universal grinding machine, complete—Bidder 42, \$985, 135 days.

Class 2. Six wet tool grinders—Bidder 52, \$132.90, 30 to 60 days.

Class 3. One open side automatic surface grinder—Bidder 33, \$800, 60 days; 47, \$755.74, 70 to 90 days; 52, \$720, 30 days; 86, \$569.50, 75 days; 90, \$678, 25 to 35 days.

Class 4. One sprue cutter—Bidder 47, \$315.20, 30 to 45 days; 52, \$395, 30 days; 56, \$400, 14 days; 62, \$339, 35 days.

Class 5. Three triple head bolt cutters and one double head bolt cutter—Bidder 41, \$4860, 90 to 120 days; 47, \$3055.40, 120 to 145 days; 52, \$2280, 60 days; 90, \$2190, 30 to 40 days.

Class 6. One hammer core machine—Bidder 23, \$85, 30 days; 47, \$69, 7 to 30 days; 52, \$88.75, 30 days; 56, \$95, 10 days.

Class 7. Four valve reseating machines—Bidder 23, \$353.50, 30 days; 28, \$200, 10 days; 33, \$350, 4 days; 46, \$350, 5 to 10 days; 47, \$350, 2 to 15 days; 52, \$199.50, 30 days; 68, \$350, no time; 95, \$350, 30 days; 96, \$350, 10 days.

Class 10. One steel tired car wheel lathe—Bidder 54, \$5885 and \$5476, 180 days.

Class 11. One double head key lathe—Bidder 47, \$887.25, 10 to 130 days; 62, \$952, 120 days.

Class 12. Three single head axle lathes—Bidder 33, \$5230, 60 days; 47, \$2787, 42 to 60 days; 52, \$4965, 60 days; 54, \$4035, \$4590 and \$5265, 60 days; 62, \$5295, 90 to 120 days; 90, \$4800, 35 to 45 days.

Class 13. One combination pattern makers' lathe—Bidder 58, \$1275, 120 days; 62, \$1195, 75 days.

Class 14. One radial drilling machine—Bidder 47, \$1497.50, 120 to 135 days; 54, \$1327 and \$1505, 180 days; 62, \$1495, 35 days.

Class 15. One universal radial drill—Bidder 47, \$1252.50, 75 to 90 days; 52, \$1100, 120 days; 54, \$1425 and \$1080, 14 days; 90, \$1415, 80 to 90 days.

Class 19. One cold saw for cutting I-beams, rail, &c., and

12 saws for same—Bidder 64, \$1354.70, 60 days; 85, \$1550, 75 days.

Class 20. One automatic saw grinder—Bidder 23, \$85 and \$75, 30 days; 64, \$100, 60 days; 85, \$198, 75 days.

The following bids for pumping machinery were received at Williston, N. D., September 10, for Buford-Trenton project:

Bidder 1. De Olier Engineering Company, Philadelphia, Pa.

2. McCay Engineering Company, Baltimore, Md.

3. N. S. Sherman Machinery Company, Independence, Kan.

4. Camden Iron Works, Camden, N. J.

Item 1. Four pumping units for the intake—Under condition 1, paragraph 45, bidder 1, motor 91, pump 70; under condition 2, paragraph 45, bidder 1, motor 91, pump 70; under condition 3, paragraph 45, bidder 1, motor 89, pump 66.6; total, \$14,790. Bidder 2, motor 91, pump 70; 91, 70; 89, 70; total, \$19,105. Bidder 3, pump 70, 65, 60; total, \$20,644.80. Bidder 4, motor 91, pump 70; 91, 70; 89, 70; total, \$17,375.

Item 2. Two pumping units for station No. 2, with induction motors—Under condition 1, paragraph 45, bidder 1, motor 89.8, pump 87.4; under condition 2, paragraph 45, bidder 1, motor 89, pump 70; under condition 3, paragraph 45, bidder 1, motor 88, pump 70; total, \$7390. Bidder 2, pump 90, pump 62; 89.2, 63; 88.4, 65; total, \$8142. Bidder 3, pump 70, 70, 70; total, \$7907.20. Bidder 4, motor 90, pump 62; 89.2, 63; 88.4, 65; total, \$6372.

Item 3. Two pumping units for station No. 2, with synchronous motors—Under condition 1, paragraph 45, bidder 1, motor 89, pump 67.4; under condition 2, paragraph 45, bidder 1, motor 89, pump 70; under condition 3, paragraph 45, bidder 1, motor 87, pump 70; total, \$9005. Bidder 2, motor 89, pump 62; 89, 63; 87.5, 65; total, \$9747. Bidder 3, pump 70, 70, 70; total, \$8687.20. Bidder 4, motor 89, pump 62; 89, 63; 87.5, 65; total, \$8180.

Item 8. One 5-ton traveling crane—Bidder 1, \$665; 2, \$700; 3, \$1650; 4, \$469.

Totals for entire nine items: Bidder 1, \$40,906; 2, \$47,790; 3, \$52,580.45; 4, \$40,574.50.

An Alloy for Steel Castings.—A pamphlet issued by the Dartium Syndicate, Limited, 28 Basinghall street, London, E. C., England, deals with the manufacture of steel castings and tool steel by the use of Dartium alloy. It is stated that in the manufacture of Dartium steel castings, when Bessemer or open hearth scrap containing from 0.45 to 0.50 per cent. of carbon is used, the quantity of alloy required is from 5 to 7½ per cent. If the stock is lower in carbon a larger quantity of alloy is necessary. For the production of tool steel, open hearth steel, such as is used for the manufacture of boiler plates, is suggested. With this from 15 to 25 per cent. of alloy is required. The resulting metal, it is stated, will take any degree of hardness in tempering by quenching. The Dartium Syndicate, Limited, has a special form of crucible furnace, consisting of a melting chamber, a pre-heating chamber and a hot air stove. Other forms of furnace may be used, such as the ordinary Sheffield melting hole, with either coke, gas or oil as fuel. The pamphlet contains suggestions as to the use of flux with the scrap where it is dirty or much oxidized; also as to the preparation of molds and the annealing of steel castings. A diagram is given showing the extent to which bars of Dartium cast steel have been bent cold without fracture after annealing from one to seven days. It is claimed that the use of the alloy enables engineering shops and ordinary iron foundries to use their own wrought iron and steel scrap in the manufacture of steel castings and tool steel; also that malleable castings can be made with tensile strength approaching that of mild steel.

The Overseas Limited, the new train of the Canadian Pacific Railroad, on its initial trip covered the 3070 miles between Quebec, Province of Quebec, and Vancouver, British Columbia, in 96 hr.; arriving at Vancouver on September 5 on time. The connecting steamer trip from Liverpool to Quebec, 2633 knots, or 3028 miles, was made in 6 days, 7 hr., 50 min.; 6 hr. and 10 min. quicker than any previous record for this route. If the schedule is maintained in crossing the Pacific the 6271 knots (7212 miles) will be covered in 18½ days, making a total of 29 days for the 12,000-mile journey from Liverpool to Hong Kong.

Trade Publications.

Electric and Air Drills.—Chicago Pneumatic Tool Company. Fisher Building, Chicago, Ill. Special circular No. 56. Pertains to special electrical tools and accessories, including air cooled Duntley electric drills (described in *The Iron Age*, July 12, 1906), standard types of Little Giant drills, improved Little Giant drills with Corliss valves (described in February 8, 1906, issue), and Boyer and Keller drills and hammers. An inclosed reprint from the *Montreal Gazette* refers to an exhibition test of the Duntley electric drill.

Saw Table.—Colburn Machine Tool Company, Franklin, Pa. Catalogue B. Contains illustrations of the Colburn universal saw table, for which many novel features are claimed. It is not only adapted to pattern work, but is also suited to a variety of work in sash, door and blind factories, furniture and piano factories, car shops, &c.

Grinders.—Landis Tool Company, Waynesboro, Pa. Catalogue. Size, 6 x 9 in.; pages, 75. Subject, "Landis Grinders; How to Use Them." Offers suggestions to the users of grinding machines that have been found valuable in properly caring for and profitably operating them. Dimensions of the company's universal, plain, plain self-contained grinding machines and gap machines are appended.

Motors.—Westinghouse Electric & Mfg. Company, Pittsburgh, Pa. Special publication 7049. Deals with direct and alternating current motors, including horizontal, back geared and vertical direct current motors of the types S, SA, R, K and elevator motors type S, and alternating current motors, horizontal, back geared and vertical in types CCL, F, HX and CC. Starting devices for alternating and direct current motors are also referred to.

Drop Hammers.—Billings & Spencer Company, Hartford, Conn. Catalogue. Size, 5 x 7½ in.; pages, 43. Concerns the company's patent improved line of drop hammers and other forging machinery. The model B hammers are made in 14 sizes, ranging in weight of hammer blows from 400 to 3000 lb. Illustrations show parts of the hammers, including the automatic trip, patent releasing gear, head construction, oil guards, die shoes, board guard, drop boards, &c. Parts are also listed. Other machines described and illustrated include improved trimming presses, hot saws and heating furnaces.

Rock Drills.—Ingersoll-Rand Company, 11 Broadway, New York. Catalogue No. 383. Size, 6 x 9 in.; pages, 40. Subject, "The Temple-Ingersoll Electric-Air Rock Drill" for mining, tunneling, quarrying and general rock excavation. The drill is one that is operated by compressed air furnished by a compressor and direct connected motor on a portable truck, which follows the drill into the heading. In this way it is unnecessary to run a long line of piping which is liable to leak, and a particular advantage is that electric wires are much easier laid and shipped than piping. Various illustrations show the principal parts of the drill and equipments in operation.

Conveyors.—Jeffrey Mfg. Company, Columbus, Ohio. Folder. Shows a model equipment for pulp mills, consisting of Jeffrey flexible wire rope conveyors.

Steam Traps.—Greenaway Company, Detroit, Mich. Pamphlet. An exposition of the construction, operation and desirable features of the Greenaway trap illustrated, with details that bring out these features. This trap was described in *The Iron Age*, May 31, 1906.

Babbitt Metals.—More-Jones Brass & Metal Company, St. Louis, Mo. This company manufactures some 18 different grades of Babbitt and anti-friction metals, the composition and particular field of usefulness of each of which is described in this pamphlet. Under the head of Babbitt metals are grouped those made according to the original Babbitt formula or on slight variations of the original. These are among the higher priced since their elements are more expensive. For certain services where cheaper constituents may be substituted, as for example, lead to take the place of tin, other anti-friction metals are made and are claimed to be entirely suitable for the purposes outlined.

Electric Motors and Brakes.—Westinghouse Electric & Mfg. Company, Pittsburgh, Pa. Two circulars. No. 1129 explains the construction and operating characteristics of the Westinghouse No. 119 railroad motor for direct current service. No. 1134 deals with electrical and mechanical brakes for Westinghouse type K motors.

Water Softening and Purifying.—Robert C. Smith Company, 929 Monadnock Block, Chicago. Pamphlet. Describes the Smith continuous water softener and its mode of operation.

Crushing and Grinding Machinery.—Sturtevant Mill Company, Harrison square, Boston, Mass. Pamphlet. Describes and illustrates steel rock breakers, gyratory breakers, roll jaw fine crushers, sectional crushers, rotary fine crushers, sample crushers, sample crushing rolls, sample grinders, a portable plant, balanced crushing rolls, centrifugal finishing rolls, roll shell turning device, automatic feeder, Akron Chillian mill, improved Huntington mill and screens.

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HARDWARE

THERE is doubtless as a general principle a wide difference in the mercantile as compared with the manufacturing field in the appreciation of the value of time and the necessity of making the best use of it. In every well ordered manufacturing plant care is taken that employees do not waste time, but that every minute is utilized in some kind of work. What is lost through the idleness of workmen for even a few minutes a day aggregates in the course of a year, as has been statistically shown, a sum sufficient, when the results of the business are computed, to diminish seriously the margin of profit, if not removing it altogether. The manner in which loss of time in factories is guarded against would probably be a revelation to many an easy going merchant.

The value of time and the importance of getting all the service possible out of employees is recognized in many of the best and most efficiently directed wholesale houses in Hardware and other lines, and yet it is questionable if the principle, even in such instances, is given the same practical deference and attention as it receives in the manufacturing end of the trade. In the average retail store, however, it is conceded that much time is lost, as the clerks and probably those over them are frequently in a waiting attitude, in practical idleness indeed, instead of being engaged in doing something which contributes to the profit or at least the carrying on of the business. This tendency is most noticeably illustrated in the case of salesmen who are waiting for customers. Some of this idle time has been spent, we may assume, in the straightening up of the stock and the getting of everything into perfect order, but that being done, unless special care is taken there will be idle and therefore unproductive and profitless time.

How to prevent this, how to arrange work in the store and perhaps behind the counter so that the waiting salesman shall be employed on something which helps the business to make good, is a question which has received not a little attention from painstaking and thoughtful merchants, with the result that in not a few cases means have been found and methods devised looking to the utilization of all the energies of their employees. How this is to be accomplished in any particular case will of course depend on the special conditions in each store, but the problem is deserving of careful consideration from each merchant or manager under whose direction there is any of this waste going on. How to turn such idle moments, which in many cases in the course of the day amount to hours, to profitable use, how to give the business the benefit of the energy which is thus lost so far as any practical results are concerned, how, in short, to get value for the time paid for—are questions which call for careful thought and planning and perhaps for not a little change in existing methods.

Condition of Trade.

The advance of the season is making active call upon the jobbers for goods related to fall and winter trade, although in these lines merchants throughout the country who are up to date in their methods had already covered their requirements. The trade, however, continues in remarkable volume for practically all kinds of goods and the wholesale houses are kept very busy, so much so that in not a few lines their stocks are becoming light if not actually depleted. Manufacturers find themselves subject to a heavy and steady pressure to turn out goods in greater quantities than their facilities provide for, with the result that many of them are forcing production, often at some inconvenience and disadvantage, and even then are not able to satisfy their customers. Some merchants in their solicitude for goods are doubtless at times unreasonable in their urgency, perhaps making up for their own tardiness in purchasing by efforts to get their orders executed without delay. Besides the great volume of business in every line a marked feature of the situation is the strength of prices and the advances which are almost constantly taking place. In the following columns attention is called to some of these advances. The market is decidedly a sellers' market, as buyers are more anxious to obtain goods than about the prices they are compelled to pay. Conservatism in making advances is, however, a characteristic of the market. There is on the part of the larger and wiser manufacturers a reluctance to establish high prices, as the prevalence of prices which are unreasonably high will sooner or later tend to check prosperity and might bring about an unpleasant reaction. At this time there is, however, a general well being among the people, with exceptional opportunity for enterprise and a very promising outlook for the remainder of the year and well into 1907.

Chicago.

The volume of business transacted by several of the largest Western jobbers thus far this month is slightly in excess of that done during the same period a year ago, and the indications are that the month's total will exceed by a small margin September, 1905, which up to that time was the largest month experienced by these distributors. Broken stocks are developing in an increasing number of lines, and belated shipments from manufacturers are constantly making it more difficult to maintain an assortment of sizes and styles. These difficulties are likewise reflected in the operations of retail merchants whose filling-in orders are more numerous than at any time this year. This month has developed a steady upward movement of prices which is indicative of the well-filled order books of manufacturers rather than the increased cost of raw material. Copper Sheets and Bottoms have been advanced 1 cent a pound, and the makers of Iron and Steel Washers have issued a new list establishing a basis higher than has been prevailing. Prices of Spades and Shovels have been withdrawn, and this action is taken as a forerunner of an early advance. On Nails and Wire products generally the manufacturers are naming higher prices. The movement of Corn Harvesting Tools is heavy, and is undoubtedly in proportion to the record-breaking crop that is predicted. From a few merchants filling-in orders are already being received, but this is by no means general. Financial conditions throughout the West and Northwest are in keeping with the general prosperity of the country and bills are being promptly met.

NOTES ON PRICES.

Wire Nails.—The announcement made to the trade by the American Steel and Wire Company, on September 19, to the effect that all previous quotations on Wire Nails, Barb Wire, Smooth Fence Wire and Staples were withdrawn by the company, was in the nature of a restoration of the official schedule of prices which went into effect January 6, 1906, which made the base price of Wire Nails \$1.85, f.o.b. Pittsburgh, in carloads to jobbers. Although this schedule of prices has never been officially changed, Nails have been sold in many cases at 5 cents less per keg, in carload lots, during the early summer and up to September 19, owing to competition. Similar conditions existed in Barb Wire, Smooth Fence Wire and Fence Staples. It is understood that independent mills are now maintaining the restored schedule of prices on all Wire products. Heavy bookings are anticipated in the way of contract orders for future delivery during the next three months. The extreme hot and humid weather during the summer interfered materially with the output, as far as the efficiency of the workmen was concerned, but orders are now being shipped with a fair degree of promptness. Official quotations now firmly maintained are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers.....	\$1.85
Carload lots to retail merchants.....	1.90

New York.—Some difficulty has been experienced by jobbers in receiving prompt shipments of Nails, owing to demand and low stocks in manufacturers' hands. Demand for small lots from store is good, and quotations remain on the basis of \$2.05 per keg, but may be advanced to \$2.10 in the near future, owing to the restoration of the \$1.85 official schedule.

Chicago.—Nails and Wire products were advanced by the American Steel & Wire Company \$1 a ton on Thursday, September 20, and the independent manufacturers have since taken similar action and are maintaining the same basis. As the bulk of the tonnage for the fall trade has already been placed with the mills, the manufacturers will not derive as much benefit from these higher prices as would have been the case had this action been taken early in August. The jobbers, however, are given an extra margin on which to transact business, providing they covered their needs prior to this advance, while the spread between the cost of the raw material and the finished product is increased for the independent makers, who were compelled to operate practically at a loss on the old basis, considering the market price of rods. It is doubtful if this advance will be sufficient to net a profit, however, and the strength of the market, together with the shortage of goods, may result in premiums over prevailing prices in the near future. All of the mills are suffering from a scarcity of Steel, and while shipments of Nails have materially increased unfilled orders are growing in volume. New business booked thus far this month is almost as large as during the same period in August and there are no indications of a marked falling off in demand from large distributors within the next few weeks. Quotations are revised as follows: \$2.05 in car lots to jobbers and \$2.10 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—The market report from Pittsburgh will be found on page 836.

Cut Nails.—Demand is fair, but production has been small, so that some mills will not accept orders for shipment in less than two weeks from their receipt. The trying weather of the summer so seriously affected the efficiency of the workmen as to keep production below the usual output. There has been some increase in the demand for Cut Nails, and this, with the falling off in production, is interfering with prompt shipments. At a meeting of the Eastern Cut Nail Association, held in New York City to-day (Wednesday), quotations on Cut Nails were advanced as follows, f.o.b. Pittsburgh: Carload lots, to jobbers, \$1.90; less than carloads, to jobbers, \$1.95;

less than carloads, to retailers, \$2.05. Iron Cut Nails at points west of Buffalo and Pittsburgh are held at 5 and 10 cents advance on Steel Cut Nails.

New York.—Assortments of stock in the hands of local jobbers are depleted to such an extent that it is difficult to fill orders complete. This is the result of the inability of mills to make shipments promptly. Quotations on small lots from store are on the basis of \$2 per keg.

Chicago.—The shortage of raw material is an almost imperative factor that advanced prices be promulgated. Fall orders are coming in in increased volume and there is the same delay in shipments. Quotations prevail as follows: Steel Cut Nails, in car lots, \$1.90 to \$1.95; less than car lots, \$2; Iron Cut Nails, \$2 to \$2.05, in car lots; less than car lots, \$2.10.

Pittsburgh.—The market report from Pittsburgh will be found on page 836.

Barb Wire.—The restoration of the official schedule by the American Steel & Wire Company makes the price \$2 on Painted Barb Wire in carload lots to jobbers. Similar action is understood to have been taken by independent mills. Demand continues heavy, with indications of a large fall consumption. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots	\$2.00	\$2.30
Retailers, carload lots	2.05	2.35
Retailers, less than carload lots.....	2.15	2.45

Chicago.—There has been no abatement in the demand and the indications are that fall consumption will be fully as great as that of the early spring months this year. Prices, which have been advanced \$1 a ton, are as follows: To jobbers, Chicago, car lots, Painted, \$2.20; Galvanized, \$2.50. To retailers, car lots, Painted, \$2.25; Galvanized, \$2.55; retailers, less than car lots, Painted, \$2.35; Galvanized, \$2.65; Staples, Bright, in car lots to jobbers, \$2.15; Galvanized, \$2.45; car lots to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—The market report from Pittsburgh will be found on page 836.

Smooth Fence Wire.—Concessions more or less frequently made have been withdrawn, as the schedule of prices which went into effect on January 6, 1906, has been restored by the action of the American Steel & Wire Company on September 19, the independent mills. It is understood, taking similar action. Demands for shipments, in the way of specifications on contract orders, are greater than production. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	\$1.70
Retailers, carloads	1.75

The foregoing prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12	12½	13	14	15	16
Annealed.....Base.	\$0.05	.10	.15	.25	.35	.45	.55		
Galvanized.....	\$0.30	.35	.40	.45	.55	.65	1.05	1.15	

Chicago.—All grades of Smooth Wire were advanced \$1 a ton on Thursday, September 20, by the American Steel & Wire Company, and similar action has been taken by the independent manufacturers. This advance, however, does not affect the large tonnage booked earlier in the year by industrial consumers and Fence manufacturers. Specifications are exceedingly heavy and continue in excess of production. We revise quotations as follows: Jobbers, \$1.90, f.o.b. Chicago, in car lots; retailers, \$2.

Shovels.—The constituent plants of the Ames Shovel & Tool Company have notified their trade of an advance of about 5 per cent. in third and fourth grade Shovels, to take effect at once. It is also announced that henceforward terms on all orders will be 30 days, net, 1 per cent., 10 days, instead of 60 days, or 2 per cent. for cash, 10 days, as heretofore. It is not yet certain what course will be taken by independent Shovel manufacturers, in view of the above action, but it is generally believed that

prices on cheaper grades of Shovels have been uncomfortably close, and most producers will welcome the opportunity to follow suit.

Sash Cord.—The meeting of Sash Cord manufacturers, held last week in this city, resulted in a reaffirming of prices. As a result it is generally expected that the market will stiffen somewhat, although some makers are said to be unusually active in soliciting orders.

Vises.—Manufacturers' quotations on Blacksmiths' Vises are somewhat higher, and an advance of about 5 per cent. has been generally made.

Farm bells. Etc.—Prices on Farm Bells and Church and School Bells hold steady to firm, manufacturers feeling the effect of the increased cost of raw material. Farm Bells may be quoted in a general way to the retail trade at 2½ cents per lb., but the jobbers often sell them at 2¼ cents, the manufacturers' price on round lots in less than carload shipments being 2 cents. The market for Church and School Bells is fairly represented by a discount of 60 per cent. Manufacturers report a steady volume of business, which is fully equal to last year's record, if not ahead of it, and trade promises to continue satisfactory as long as general conditions remain favorable.

Wood Chair Seats.—Manufacturers of Wood Chair Seats have made an advance in prices approximating 20 per cent., quotations now reported being 70 per cent. discount on carload lots and 60 per cent. on smaller quantities.

Lathe and Planer Chucks.—Prices on many styles of Lathe and Planer Chucks have been advanced from 15 to 20 per cent. by leading manufacturers. This is the second upward movement which has taken place since the first of the year, and it would appear that there is more or less concert of action among the different producers. A large volume of business is reported commensurate with the heavy demand for everything in the Machine Tool line.

Rivets.—At their meeting last week the manufacturers adopted new prices in Structural and Boiler Rivets, which may now be quoted in small lots, as follows, f.o.b. Pittsburgh:

Structural Rivets.....	\$2.40 per 100 lb.
Boiler Rivets.....	2.55 per 100 lb.

Other styles of Rivets are subject to the following discounts on orders from fair retail trade:

Iron or Steel Rivets.....	75 @ 75 and 5 %
Tinned Rivets.....	70 @ 70 and 5 %

Following are the schedules of extras, which remain unchanged:

Standard Extras.	
	Per 100 lb.
½ in. and 9-16 in. diameter.....	\$0.50
¾ in. and 11-16 in. diameter.....	.15
Lengths shorter than 1 in.....	.50
Countersunk heads in quantities less than 1000 lb. of one diameter.....	.25
Flat head Rivets.....	.25
Rivets packed in 100 lb. kegs.....	.25
Special Extras.	
	Per 100 lb.
Annealing cold made Rivets ½ in. diameter and larger....	.25
Small orders for miscellaneous sizes for less than 2 tons to parties not under contract.....	.10
Rivets from stock for immediate delivery (store price)....	.50

Tinware.—Prices on all grades of Tinware are holding very firm and many of the manufacturers who are acting harmoniously are said to favor a further advance on account of the demand for goods and the conditions of the market for raw material. Report has it that a movement for the establishment of higher prices is already on foot and stands a good chance of success. Quotations are now made on the new price-list, which was recently placed in the hands of the trade.

Galvanized Ware.—The scarcity of sheets and the heavy demand for finished goods have led to further advances in Galvanized Ware, including Pails, Tubs and Coal Hods. Prices are said to have been raised by independent action on the part of manufacturers who were forced by the prevailing conditions to take this step. Quotations of leading producers are reported to be from 5 to 10 per cent. higher than about two weeks ago.

Sand Paper, Emery Cloth, Etc.—Quotations on Sand Paper, &c., have been advanced by leading manufacturers during the past few days. The discount to retail trade on Sand Paper, Emery Paper and Emery Cloth is on the new basis about 50 and 10 per cent., and on Garnet Paper 25 per cent. Some lines, however, are quoted slightly lower.

Building Papers.—There has been little change in the price of Building Papers for several months, but the demand has continued to be exceptionally good. The various plants producing these lines have been busy even through such months as July and August, when they are, as a rule, quiet. Everybody is busy and it is difficult to fill orders, although deliveries have been fairly prompt. Existing conditions are accounted for largely owing to the mild, open winter, when both collectors of raw materials, such as rags, paper, &c., as well as the makers of Roofing and Building Papers, expect to accumulate stock against the spring and summer demand. In consequence of the active building, however, through the winter and subsequent months, stocks have been kept low, and while manufacturers are still somewhat behind with their orders a better condition now exists concerning the supply and quicker deliveries are being made. The high cost of raw material, said by an important interest to surpass anything of like character in some kinds of it for 20 years, is responsible for some advances, which, however, are not marked, the following figures representing the market in fair quantities, viz.:

Rosin Sized Sheathing, 500 sq. ft.:	
Light weight, 25 lb.....	40 to 50 cents per roll.
Medium weight, 30 lb.....	50 to 55 cents per roll.
Heavy weight, 40 lb.....	65 and 70 cents per roll.
Deafening Felt.....	\$50 per ton.
Red Rope Roofing, 200 sq. ft.....	\$1.75 per roll.
Tarred Roofing Paper:	
One-ply, 400 sq. ft. to roll.....	\$31 in car lots.
	\$35 in less than car lots.
Two-ply, 108 sq. ft.....	57 cents per roll.
Three-ply, 108 sq. ft.....	80 cents per roll.
Slaters' Felt, 500 sq. ft.....	76 cents per roll.

Leather Belting.—The market for Leather Belting is firm and regular, and business is excellent, particularly with manufacturers who sell to merchants and consumers. Some factories are being run day and night to supply the requirements of their trade. Belt makers who depend for their principal business in equipping new factories, find that it requires more effort to secure the same amount of business than it did a year ago. There is a scarcity of hides to meet manufacturers' requirements, particularly those used for Belt Lacing, and on account of the shortage in lacing hides prices have recently advanced about 10 per cent., and Cut Leather Lacing has been advanced about 5 per cent. Some manufacturers are far behind on their orders for Lacing. While hides used for making Belting are about 5 per cent. higher than they were two months ago, no recent change has been made in the prices of Belting. The following quotations represent the market on this line in a general way:

	Discount.
Extra Heavy, Short Lap.....	60 and 5 %
Regular, Short Lap.....	60 and 10 and 5 %
Standard.....	70 %
Light Standard.....	70 and 5 %
Cut Leather Lacing.....	50 %
Leather Lacing Sides, per square foot.....	25c.

Copper Products.—Metals composed wholly or in part of Copper, sympathizing with the advance in Ingot Copper, have been generally advanced within the past week. The reason offered is the familiar one of demand outstripping the supply, one estimate of the general situation being that demand is equivalent to 20 per cent. increase with but 5 per cent. greater output of material to supply it. The opinion is also held in the trade that the increases recorded below are only the forerunners of others in the future. Be that as it may, the prices here given reflect the present market for shipments from stock in warehouse to the average buyer, the larger houses getting supplies direct from mill obtaining somewhat lower figures. Some of the advances are as follows: Sheet Copper, 1 cent per pound; Seamless Brass Tubes, 1 cent; Seamless Copper and Bronze Tubes, 2:

cents; Yellow Metal Rods and Sheets, 1 cent; Tobin Bronze, 1 cent, and Copper Wire to large consumers, 1 cent per pound. The present prices are:

Sheet Copper	Base 24c.
Sheet Brass and Bronze	Discount 10 %
Brass and Bronze Rods	Discount 15 %
Brass and Bronze Wire	Discount 7½ %
Copper Wire	Discount 10 %
Copper Rods	Net per lb. 24c.
Soldering Copper, less than 300 lb.	Net per lb. 25c.
Soldering Copper, 300 lb. and over	Net per lb. 23c.
Seamless Brass Tubes	Base 23c.
Seamless Copper and Bronze Tubes	Base 27c.
Brazed Brass and Bronze Tubes	Discount 22½ %
Copper Rivets and Burrs	Discount 40 and 2½ %
Yellow Metal Rods	Base 20c.
Yellow Metal Sheets	Base 22c.
Tobin Bronze	Base 22c.

Crayons, Metal Workers', Machinists', Etc.—North Carolina Tale and Mining Company, Hewitt, N. C., makes the following quotations on its line of Crayons for metal workers, machinists, &c.:

<i>Metal Workers' Crayons.</i>		Discount.
5 x ¼ x 3-16 in., per gross	\$1.50	15%
5 x ¼ x ¼ in., per gross	1.75	15%
<i>Rolling Mill Crayons.</i>		
5 x 1¼ x 3-16 in., per pound .....	.15	20%
5 x 1¼ x ¼ in., per pound .....	.15	20%
5 x 1 x 3-16 in., per pound .....	.15	20%
<i>Machinists' Crayons.</i>		
5 x ¼ x ¼ in., per gross	1.25	25%
<i>Round Crayons.</i>		
5 x ¼ in., per gross	2.00	20%
5 x 5-16 in., per gross	2.00	20%
5 x 3-16 in., per gross	1.20	20%
Blanks for Acetylene and Coal Gas Burners and Electrical Insulation under 3 in. in length, per pound .....	.15	20%

Rope.—Demand for the present month has been excellent, and it is anticipated that fall trade will be large. Prices on Manila Rope are stronger and have generally recovered the position they held two or three weeks ago. New York quotations on Rope are as follows: Pure Manila, 12¼ to 12½ cents; B quality, 11½ cents; Pure Sisal, 9 cents; No. 2 quality, 7½ to 7¾ cents; No. 1 Jute, ¼ in. and up, 8 to 8½ cents; No. 2 Jute, ¼ in. and up, 7 to 7½ cents per pound.

Spirits Turpentine.—Demand is restricted to jobbing lots at this point, with a fairly firm market. New York quotations are as follows, according to quantity: Oil Barrels, 63½ to 64 cents; Machine Made Barrels, 64 to 64½ cents per gallon.

Window Glass.—The Amalgamated wage scale for the fire of 1906-1907 has been signed by manufacturers representing a capacity of over 600 pots. It is estimated that less than 400 pots, outside of the factories of the Manufacturers' Glass Company, are likely to be put in operation this month. Not many of these are expected to start before October 15, so that the amount of Glass put on the market in the meantime will not affect the market to any great extent. Jobbers and many manufacturers feel that it would be in the interest of the trade if a general start were not made before November 1. The advance in wages agreed upon is said to represent 5 per cent. on double strength and 10 per cent. on single strength Glass above those of the last fire. Last year there was a shortage of about 20 per cent. in the skilled labor necessary to fully man the factories, and a corresponding shortage will probably be in evidence this year. Owing to these conditions, an advance in prices is probable, which may be made to apply on the broken stocks now in jobbers' hands. Jobbers' quotations, from jobbers' list, October 1, 1903, are as follows: Greater New York, single, 90 and 5; double, 90 and 10 per cent. discount. Eastern District except the Boston District, 90 and 10 per cent. discount for all sizes of single and double strength. In the Boston District quotations are reported as being 90 and 15 for all sizes of single and double strength.

Linseed Oil.—Although prices of seed fluctuate, crushers have made no change in prices, which are, from the viewpoint of large buyers, too high to justify placing contract orders. Demand is limited to immediate requirements. New York quotations are as follows, ac-

cording to quality and seller: City Raw, 37 to 38c. per gal.; out of town Raw, 36 to 38c. per gal. Boiled Oil is 1 to 2c. per gal. over Raw.

SPECIAL MEETING OF TIN PLATE AND METAL MERCHANTS.

UNDER the auspices of the National Hardware Association a meeting of the wholesalers of Tin Plate, Sheet Iron and kindred goods has been called for Tuesday, October 16, at 10 o'clock a.m., at the Marlborough-Blenheim, Atlantic City, N. J. While this meeting is held under the auspices of the National Hardware Association it will be a gathering in the interest of all metal merchants, whether connected with that association or not. Arrangements have been made with the railroad companies of the country to grant a rate of one and one-third fare for the round trip on the certificate plan. Subjects which are of vital importance to those engaged in this line will be given serious consideration and discussion. It is the hope of the committee in charge of the meeting that every wholesaler of these commodities will be present, and it is requested that all who can attend will notify the secretary-treasurer of the National Hardware Association, T. James Fernley, 505 Commerce street, Philadelphia, at once.

THE PITTSBURGH MARKET.

Wire Nails.—Effective Thursday morning, September 20, prices on Wire Nails were advanced 5 cents a keg. The probability of an advance in prices of Wire Nails has been referred to in this report for some time past, and is due to the abnormal demand, the scarcity and high prices of steel and to the fact that the mills are already behind in deliveries for fall trade. It is believed there will be no trouble whatever in maintaining the higher price, which is now being quoted by all the leading mills. It is understood that most of the large jobbers covered their requirements for the next 60 days prior to the advance, and are specifying heavily on these contracts. We quote: Wire Nails, \$1.85 in carloads to the large jobbing trade and \$1.90 in carloads to retail merchants, f.o.b. Pittsburgh, plus actual freight to point of delivery, terms 60 days, less 2 per cent. off for cash in 10 days. The above prices are now absolute minimum of the market.

Cut Nails.—The mills making Cut Nails are already very much behind in deliveries, which seem to be getting worse, due to the scarcity of steel and also to the shortage of cars in certain sections. The market is very firm, and we understand that some Eastern mills are quoting as high as \$1.90 on new business.

Barb Wire.—Effective Thursday, September 20, prices of Barb Wire were advanced \$1 a ton and the higher price is now being quoted by all the mills, and in view of the shortage in supply of steel and high prices there seems to be no doubt but that the advance will be firmly held. A moderate amount of new tonnage is being entered, and buyers are specifying freely on contracts. Stocks of some manufacturers are so low that they are asking premiums for prompt shipments. We quote: Painted Barb Wire, \$2, and Galvanized, \$2.30, in carload lots to the large jobbing trade, with the usual advance of \$1 a ton to retailers in carload lots, f.o.b. Pittsburgh, 60 days, or 2 per cent. off for cash in 10 days.

Smooth Fence Wire.—Manufacturers who placed contracts early in the year are specifying very liberally and the mills are four weeks or longer behind in deliveries. Prices have been advanced \$1 a ton, effective Thursday, September 20. The manufacturers of Field Fencing are having the largest trade in their history, and are placing heavy orders for Fence Wire, and specifying very freely on contracts. Manufacturers anticipate no trouble in getting the advanced price from the trade. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	\$1 70
Retailers, carloads	1.75

The above prices are for base numbers, 6 to 9.

SALESMEN AND CONTRACTS.

There was a time when honesty was a virtue above heroism. The average buyer fails to recognize it unless to his advantage. He invariably lives up to a contract when prices advance. In case of a decline he is apt to forget that he has one.

BY FRED. BRADFORD ELLSWORTH.

I OFTEN hear the old time business man remark that in his day when a man agreed to do a thing he did it, and that was all there was to it. Nowadays he is inclined not to do it, if it pleases his fancy.

"What is the price on a carload of your goods?" Inquired a buyer of me one day. I gave him the desired information, and said, "That price is for prompt shipment and subject to change without notice." "Come in this afternoon, and I'll give you an order for two cars," he pleasantly replied, and when I called again

He Handed Me an Order

which read as follows: "Please enter our order for one car of goods as follows, the balance to be shipped in ninety days, you to meet the market price, in case of a decline, or we to have the privilege of canceling the order." I informed him that was not my way of doing business, that I considered it an order for one car of goods, but would send it in, and did so, instructing my firm to ship the first car at once, and when the time arrived to cancel the balance if there was any decline in our prices, for I knew full well that the firm with whom I was dealing was notorious among the manufacturers for sharp practice, and also that they would claim a ridiculous price to be met when the time arrived. There are exceptions, but as a rule

A Contract Does Not Amount to a Row of Pins

except to pin it up as a remembrance. If prices advance, the buyer will take all he can get, and more if permitted. If they decline, he will expect you to meet same, or will buy elsewhere, and if questioned will invariably reply "We haven't been buying of late. Had a larger stock than expected." Of course an unsophisticated salesman believes this.

I once made a contract with a very large concern to furnish them goods for a year at a stipulated price for their usual monthly requirements. The price was a low one, and they kept ordering the usual monthly amount. About three months before the expiration of the contract they entered some very large orders, enough to carry them well into the following year. Through an error the goods were shipped.

We Had Lost Heavily on the Deal,

but my firm had made it a special point to ship their orders promptly; in fact, had shown them the preference. Not a word was said about their overordering until they requested another contract. When I called on them I said: "Gentlemen, we agreed to furnish you your usual monthly requirements, which we have done. We did not agree to supply you with goods for the coming year which you ordered and which were shipped by mistake. Before I make another contract I expect you to pay me the difference between the contract price and the market price at that time for the goods." The firm, one noted in the commercial world for fair dealing, at once appreciated the situation, and without a moment's hesitation did so. They realized that they had secured the goods at less than cost of manufacture; that they were exceptionally good goods, and that shipments had been promptly made, which is an all important factor in a contract. They did the honorable, just and commendable thing under the circumstances, and I wish there were many other concerns of a similar nature.

Contract Was Only an Option.

I recollect very vividly a deal I once had with a large jobbing house. They requested a price on a certain number of cars of goods for another party. We quoted them the price on a 12-month contract, agreeing not to quote the other concern. In a few days along came their ac-

ceptance, which read: "Enter our order for — as per your quotation." They ordered a few cars, and then the price declined, and we received no more orders. They were buying the goods cheaper and delivering them to the party they had made a good contract with, and to whom we had agreed to ship the goods. When questioned on this matter they blandly informed me that the concern was not going to use the amount contracted for. I informed them that that was immaterial to me, that they had contracted for the goods, and we expected them to take them. They attempted to impress the idea that the contract was only an option, but failing in this, they ordered some of the goods for their own stock. Result: We lost business we might have secured direct at a profitable price. The jobber did not live up to his agreement with us, and some other manufacturer filled the contract. Question: "Does it pay to make contracts?" Answer: "Not on your life."

Dishonor Not Confined to the Buyers.

This is not a wholly one sided proposition. There are many manufacturers who are as dishonorable as the people with whom they deal. They will make a contract with a buyer, and when prices advance to such an extent that they are losers on the deal they cease to live up to the contract. I have in mind a certain manufacturer who made a contract to furnish a jobber with Bolts and Washers. The prices advanced to such an extent that the cost of material for Bolts equalled the selling price. The manufacturer had shipped about 75 kegs of Washers, and whenever requested to ship Bolts sent Washers. The buyer informed me of the predicament he was in, and requested my advice. I told him not to pay for what he had until the manufacturer had fulfilled his part of the contract. When the bills fell due, request for payment was made, followed by several letters intimating lax business methods. The buyer then called the manufacturer's attention to the contract, saying that the money was ready for them when they fulfilled their part of it. The manufacturer never shipped the balance due or requested settlement of account. It would have been a tremendous loss to him had he been compelled to deliver the goods. As it was, it was a heavy loss to the jobber, for he was unable to get the goods at any price within a reasonable time.

The Ludicrousness of Contracts

was forcibly impressed upon me lately. A buyer for a well-known Hardware house was telling me a certain manufacturer had failed to live up to an agreement with him. "Never again will that man be able to do business with me; he is dishonest, and this house does not transact business on those lines," he said. Then he requested me to make a contract with him. I refused, but agreed to accept his orders to be shipped at stated intervals, but not subject to specification. He gave them to me. My reason for declining a contract was because he was no better than the manufacturer of whom he had been speaking. A clear case of "if you beat another man, it is shrewdness; if he beats you, it is dishonesty."

Getting Back at a Competitor.

Speaking of contracts reminds me of a malleable iron company who quoted a jobbing Hardware house on castings for a year, but would not agree to make it subject to a decline of the market. A competitor secured it. The jobbing house occasionally placed small orders to fill in stock with the malleable iron company. When the latter found out who got the contract, they billed a couple of barrels of castings to the jobber at a price way below cost of manufacture. The concern who secured the contract had to meet those figures and fill the balance of the contract at a heavy loss, which taught them a wise lesson.

My Advice to a Salesman

is don't make contracts unless your business is such that it is absolutely necessary to do so.

When you do, stipulate just what amount it is for; and, if impossible, state the minimum and maximum amounts, and the price.

Do not make a price subject to a decline in the mar-

ket, with privilege of cancellation, for that is no contract at all.

When you have made a contract see that it is lived up to in every respect. If your firm is unfortunate enough to be losing money on it, so much the more reason why your customer's orders should receive prompt attention when sent in. He should be taken care of just as promptly as if each shipment denoted a big profit to your firm.

Business transacted in such a manner gives your firm the reputation of being honest, and that is the best reputation a firm can have, for it invariably denotes success. A firm noted for honesty cannot help but be successful when properly managed.

Sell Goods at a Ruling Market Price

whenever you can. Sell for prompt shipment and let the other fellow make the contracts if he chooses to do so. Then be satisfied with the fact that if prices decline you will get your share of the business in most cases, whether you have a contract or not.

But whatever you do, do as you agree to, and in so doing you will be building up more business all the time, and nothing will stop you.

TRADE ITEMS.

FRANK B. MCKENNEY, Rockford, Ill., has concluded a deal by which his Hardware business will pass into the hands of L. D. Ray, Belvidere, Ill., on January first next. Mr. Ray has for years been engaged in the Hardware line at Belvidere as a member of the firm of Ray Bros., in which he recently disposed of his interest. Mr. McKenney has been a Hardwareman for nearly 30 years, and is well known to the trade of the State as president of the Illinois Retail Hardware Association, now serving his second term in that office. He is also treasurer of the Rockford Merchants and Business Men's Association. His future plans have not yet been determined.

NORVELL-SHAPLEIGH HARDWARE COMPANY, St. Louis, Mo., is sending out postals announcing that on September 19 sales—goods billed and shipped—since January 1 showed an increase of just \$1,000,000 over those for the whole of 1905. The company remarks that three of the best months of the year are still left, so that 1906 promises to be a notable year in the history of the concern.

THE HALL-ROBERTSON HARDWARE COMPANY, Fargo, N. D., has secured a lease on the entire Robb-Lawrence Building, more than half of which is now occupied by the company. A number of important changes will be made in the premises about November 1, when the new lease takes effect, and the company will practically occupy the entire four floors and basement of the large building. The company was established in 1902, and with the growth of the business removed to its present quarters in 1904. A still further enlargement in the demands made by the increasing number of customers has necessitated the step which has just been taken.

AMONG THE HARDWARE TRADE.

Balfe-Conroy Company, Jacksonville, Fla., has bought out the Baird Company, and will continue to carry a complete line of Hardware, Glass, Paints, Oils, Varnishes and Painters' Supplies.

The Hardware store and business block of Cutting & Perrin, Gouverneur, N. Y., have been repurchased by M. E. Loveland, the former owner, who has returned to the town after an absence of three years.

CHURCHILL HARDWARE COMPANY, Galesburg, Ill., has lately sent out postals to its customers in which a view is given of one of the store's show windows with an attractive display of Thermometers, Scissors, Cutlery, Watches, &c. The outline of an owl, which is a feature of the company's advertising, appears on the window. This firm takes a good deal of pains in arranging exhibits in its windows, realizing that this is one of the most effective forms of advertising.

TRADE WINNING METHODS.

This department is for the description of approved methods of carrying on and extending business, and a cordial invitation is given to merchants to co-operate in the effort to make it suggestive and of practical use to the trade.

TESTIMONIAL ADVERTISEMENTS.

HOWE & SHIPLEY, Lafayette, Ind., advise us that perhaps the most effective advertising ever done by them was the publication from day to day for a considerable period of letters or testimonials from persons who had bought Stoves, Refrigerators, &c., at their store. By vigorous effort and much persuasion nearly 75 such complimentary epistles were secured. One of

THE WARREN RANGE IS A STOVE FIT FOR ANY KITCHEN.

Messrs. Howe & Shipley, City.

Gentlemen:

Several years' experience with the Warren Range has proven it to be a stove fit for any kitchen. It is well made, and its workings are satisfactory. I take pleasure in giving this testimonial of its efficiency.

WM. HILLEN,

Lafayette, Ind.

1815 N. 18th St.

Testimonial Advertisement.

these and the manner of presenting it in the newspaper advertising columns is reproduced herewith. These testimonial letters were centered in the advertisement with sufficient white space all around to make them stand out distinctly. Elsewhere in the paper an advertisement (changed daily) was carried, in which attention was called to what they had to offer in seasonable lines.

RAILROAD TIME TABLE AND RETAIL ADVERTISING.

THERE is a popular impression, founded more or less upon fact, that a merchant is sure to come out second best in any argument with a railroad. A. M. Matthews & Co., Hardware merchants of Orange, N. J.,

JUNE SUPPLIES

Lawn Mowers,
Lawn Rollers,
Grass Shears,
Sickles, Scythes,
Stones, Machine Oil,
Mower Repairs, Etc.
Garden Hose,
Nozzles, Sprinklers,
Watering Cans.
Sprayers and Spray Pumps,
For Putting Insecticides On.
Hellebore,
Paris Green,
Whale Oil Soap,
Slug Shot,
Bordeaux Mixture.

Advertising Page of Matthews' Railroad Time Table.

have, however, found a way to turn the coming and going of trains to their own account by using local time

tables as a medium for their advertising circulars. Railroad time tables are usually too large and too comprehensive for the convenience of one particular town along the route; therefore a purely local time table giving only the information constantly required in that town is likely to be preserved for reference. This is especially the case in suburban districts such as that in which the Matthews store is situated. The schedules of the railroads are usually changed four times a year at the opening of every season, thus affording the firm an opportunity to issue a new circular just at the time when they wish to call attention to spring, summer, fall or winter lines. Herewith is a reproduction of the contents of the advertising page of the time table issued by A. M. Matthews & Co., the first of June.

MANUFACTURER'S POSTAL CIRCULAR.

W. C. HELLER & CO., Montpelier, Ohio, are circularizing the trade with a series of effective postals, one of which is reproduced herewith. The postals are about 6 in. wide by 3½ in. high, the obverse side being a yellow and red, with lettering in deep black. The back



Obverse Side of W. C. Heller & Co.'s Postal.

is also in yellow and continues the story begun by "Do you know?" the remainder of the opening sentence being "that your customers are judging your stock by the general appearance of your store?" The advantages of the firm's system of Steel Shelf Boxes are then briefly touched upon. The postals are striking in appearance and are doubtless effective in bringing the merits of the goods concerned to the attention of Hardware merchants.

CIRCULARS, CATALOGUES, ETC. MOST EFFECTIVE ADVERTISING.

FROM AN IOWA MERCHANT: We advertise regularly in the newspapers, but think we obtain better business results by mailing circulars direct to the public. We also get out a catalogue, which takes well and develops our trade.

FROM A COLORADO HOUSE: We do no newspaper advertising. We confine our advertising expense to sending out descriptive circulars, and find this method successful and economical. The manufacturers whose goods we sell as a rule cheerfully furnish the printed matter, and we gladly pay the expense attendant on its general distribution.

FROM A CALIFORNIA FIRM: We do not use the daily newspapers, except when we have some specialty that we wish to push. We find that better returns come from the judicious use of circular letters, hammering away persistently until attention is secured. We have many forms for these letters and many different circulars. We spend a good deal of money every year in advertising, which is becoming more and more a study, as our effort is along the lines that promise the best returns for the money invested.

SYSTEM FOR HANDLING ORDERS.

IN its retail department the Jones Hardware Company, Richmond, Ind., keeps track of orders and charges by means of the forms reproduced herewith. All orders for delivery by wagon or carrier within the city limits are entered upon the blank shown in Fig. 1, which, it will be

Fig. 1.—Order Blank.

observed, gives the date and hour of order, name and address of customer, when delivery is to be made, by whom the order was filled and by whom checked, the blank being placed on file. One man in the store has charge of the filling of orders. He takes them from this file and distributes them to the different departments in the store, where they are filled and returned to him with the goods called for. He then checks off the articles and charges them after being checked. The order is then placed on another file, and subsequently an office employee checks the order with the charge.

The company's charges are made on a Hamilton autographic register, the slip with entries covering the order to which reference is made above being reproduced

Fig. 2.—Charge Slip from Autographic Register.

in Fig. 2. One sheet, red in color, is left with the customer, a yellow slip duplicating the order data being signed by the customer upon delivery of the goods and returned to the store and placed on file for comparison with the white slip which remains in the machine. The company charges no goods until shipped or delivered to customer, and no goods are allowed to be delivered without the charge slips.

While the business of this company is large enough to justify the employment of one man to look after these orders exclusively it is obvious that firms doing a smaller business could use the same system and diminish the liability of losing track of orders.

FACTORY COST AND BUSINESS METHODS.

Depreciation.

BY HERBERT FOSTER, NEW HAVEN, CONN.

Depreciation may be defined industrially as the gradual but constant reduction in value of any article representing an asset, but especially machinery, according to the period of its utility or before its replacement by one of new or improved design. All too frequently the manufacturer regards depreciation from a point of view altogether wrong—that is to say, it is treated as something to juggle with in order to increase or decrease, as may be deemed desirable, the amount of profits for the year. There are comparatively few who give very serious consideration to this most important matter.

REFER to the balance sheet of some of the numerous "trusts" or consolidations and note the very small amount of depreciation written off each year in proportion to the high value placed upon plant and equipment; in very few instances were the amount four or five times as great, it would be but a very conservative amount to charge off. For instance, assuming the machinery in a certain factory is good for at least 20 years, in such a case the usual plan is to write off 5 per cent. each year, the manufacturer believing that, exclusive of interest on the investment, in 20 years the value of the machine will have been completely wiped out by the annual depreciation charge.

If Five Per Cent. of the Original Cost

of the machine were written off each year, such in reality would be the case; but the majority of manufacturers, those who give little heed to the seriousness of such things, write off the depreciation from the reduced balances, or the balance of the account carried forward each year, and not from the individual cost of each machine or the total of each year's purchases or additions to the machinery account.

In order to permit the reader to grasp fully the difference in these methods, let him set down \$1000 as the cost of a machine to be retired in 20 years, and write off 5 per cent. from the reduced balance each year for 20 years, thus:

	\$1,000.00	
5 per cent.....	50.00	(first year)
	\$950.00	
5 per cent.....	47.50	(second year)
	\$902.50	
5 per cent.....	45.13	(third year)
	\$857.37,	and so on.

and see, after the twentieth year, how much he has remaining. Instead of there being nothing as it should be. Then let him continue to figure the 5 per cent. per year on the reducing balances and see how long it will take to completely wipe out the original \$1000, which should have been done in 20 years. This, perhaps, will convey forcibly to his mind the difference in methods, and enable him to form an opinion as to which is the better for him to use.

Practical Experience Has Demonstrated

the necessity as well as desirability of separating into as many accounts as possible without being burdensome, the various elements that comprise the plant and equipment. For instance, instead of having the usual Tools and Machinery account into which everything is dumped, it is much better to separate these into accounts from which different percentages may be written off, such as Machinery, Long Lived Tools, Short Lived Tools, Dies, &c. It will be observed that by pursuing this method of separating into groups according to the life of the tool or machine it becomes practicable to write off the amount or percentage of depreciation decided as being equitable for each group; for illustration, thus:

	Per year.
Machinery, estimated life 20 years.....	5 %
Long lived Tools, estimated life 20 years.....	5 %
Short lived Tools, estimated life 10 years.....	10 %
Dies, &c., estimated life 5 years.....	20 %
Main Shafting, &c., estimated life 15 years.....	6 2/3 %
Electrical Apparatus, estimated life 10 years.....	10 %
Electrical Apparatus (short), estimated life 5 years.....	20 %
Engines and Boilers, estimated life 15 years.....	6 2/3 %
Fire Fighting Equipment, estimated life 20 years.....	5 %
Piping, &c., estimated life 15 years.....	6 2/3 %
Real Estate.....	
Buildings.....	
Fixtures.....	
&c.....	

All these percentages should be figured upon the original cost of the article in each instance.

For Keeping Track of Amounts

to be written off each year from each article or group a card similar to that illustrated in Fig. 1 has been found

Date put in place *March 28, 1900* No. *574*
Description *Pett & Whitney Lathe 12' swing 4 ft Bed*
Location *Machine Shop* Transferred
Purchased from *P. H. Co. Hartford Conn*
Classified among Assets as *Machinery*
Estimated life *20* years. Rate of depreciation *5%*

ADDITIONS	DEPRECIATION	PRESENT VALUE
<i>10/1/00 50.00</i>	<i>10/1/00 25.00</i>	<i>250.00</i>
	<i>7/1/01 12.50</i>	<i>237.50</i>
	<i>7/1/02 11.88</i>	<i>225.62</i>

Fig. 1.—Machine Record Card, 3 x 5 In., Giving Complete Record of Machine, Showing Amount of Depreciation Written Off, Additions Made and Present Value.

very serviceable. It can of course be changed to suit any requirements.

In grouping these cards they should for easy reference be filed numerically for each group, and at the start in placing them behind the guide card marked with the title of the account they represent care must be taken that the total footings of the "present value" column of each group corresponds with the amount of the similarly titled account upon the private ledger. These cards should be revised monthly, so that the totals at all times agree. They thus form a complete, detailed and continuous inventory of these accounts.

The other side of machine record card is reproduced in Fig. 2. The method of continuing valuation of ma-

Description *Pett & Whitney Lathe 12' swing 4 ft Bed* No. *574*

ADDITIONS	DEPRECIATION	PRESENT VALUE
<i>Transferred from other side</i>		<i>225.62</i>
<i>7/1/01 14.50</i>	<i>7/1/01 7.28</i>	<i>218.34</i>
	<i>7/1/02 14.37</i>	<i>203.97</i>

Fig. 2.—Reverse of Machine Record Card, Fig. 1, Illustrating Method of Continuing Valuation of Machine or Tool When Obverse Is Filled.

chine or tool when obverse is filled is thus illustrated. When both sides of the card are exhausted a new card is started, and the last "present value" is transferred to it.

Numbering Each Machine.

For the benefit of those who have not already adopted any such system it is recommended that every machine

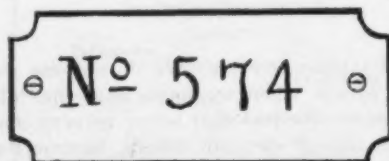


Fig. 3.—Metal Numbering Plate to Be Attached to Each Machine, the card, Fig. 1, Bearing Similar Number, Giving a Complete History of Machine.

be numbered by affixing a plate with the number stamped thereon, as shown in Fig. 3.

Filling Out the Card.

A card, as already described, is then made out, numbered similarly to the machine; the latter is fully described; where located; from whom purchased, and under what classification it is entered upon the books. The original cost, plus freight charges, cost of setting up, &c., is then entered in the "Present Value" column.

It may be noticed that provision is made for any addition that may be made to the article. For illustration, we will assume that No. 574 is a P. & W. lathe. After a few years' service an improved attachment is brought out and is purchased. The cost of this attachment is entered in the "Additions" column and added to the amount in the "Present Value" column, after the depreciation for the current year has been written off, so that the addition does not stand any charge for depreciation the year of purchase.

The card will then give a complete record of the machine—its original cost, amount of depreciation written off annually, any additions made, and the present valuation at any time.

Any expense incurred for the replacement of parts or repairs to the machine is chargeable to the proper expense accounts for the upkeep of tools and machinery, becoming an expense incident to the business of the current year. Such expenses must not be regarded as an improvement to the machine, and, as such, added to the asset account, this being entirely incorrect.

Value in Many Directions.

It must be apparent that the detailed information the auxiliary card system furnishes will prove itself of great value in many ways. As an instance, suppose among the machinery are several machines which after a few years' use it is found economical to scrap in favor of a newly invented machine capable of reducing the cost of production. The cards representing these machines are immediately available without further search, showing the amount at which they are at present valued, and which must be charged off in a lump sum. This is something that seldom happens in the experience of the small manufacturer, but among large manufacturers, especially in the steel and iron trade, it occurs more or less frequently.

An Example of Insufficient Depreciation.

It has been the writer's privilege, in his capacity of auditor, cost expert and systematizer with one of the largest and most progressive manufacturers, to recently complete a thorough revaluation of the asset accounts, and to persuade the principals of the firm to write off, in addition to the regular annual depreciation, amounts aggregating \$75,000, which represented principally obsolete tools and machinery which had accrued during the years insufficient depreciation had been written off. By so doing it made all the asset accounts upon the books represent actual facts as to valuation upon a conservative basis. If the system for determining the amount of annual depreciation to be charged off, as described in this article, is continued regardless of "lean or fat years" in business, this extraordinary measure will not in all probability again have to be resorted to—at least not for similar reasons.

Hourly Wage Rate for Each Machine.

Of late years some manufacturers have found it expedient to establish an hourly wage rate for each machine, charging on the cost sheets the number of hours the machine runs upon a given job at so much per hour, the same as an individual workman. In order to establish this hourly wage rate it is necessary to estimate the life of the machine and decide the average number of working hours it will run during the year.

To the original cost of the machine should be added the interest upon the investment for its period of life, also taking into consideration the annual depreciation. It is thus possible to establish an amount the machine will have to earn before its life is ended, and by this compute the flat hourly wage. By this method it is evident it becomes necessary to keep track daily of the number of hours the machine is run. Should this plan be adopted it is also necessary, if depreciation be included

in the computation of the rate per hour, to deduct this amount for depreciation from the annual charges when computing the percentage for overhead burden, or it will have been included twice in figuring costs.

MAIL ORDER HOUSE COMPETITION.

STUDEBAKER BROS. MFG. COMPANY, South Bend, Ind., has recently commenced the publication of a little journal under the style of *The Studebaker*, which will be "issued now and then in the interests and for the benefit of those who sell the Studebaker products." Judging from the interesting and sprightly contents of the first number the paper will doubtless meet with a warm welcome from the Vehicle trade. One of the topics touched upon in the current issue is the competition of catalogue houses. The situation and the lesson to be drawn from it are thus tersely put up to the merchant under the title of "The Mail Order House Bugaboo."

How many Buggies, Carriages, Wagons and Sets of Harness have the catalogue houses sold in your county during the past year? More than you like to think of, perhaps.

How did it happen that they sold so many?

Well, it didn't "just happen."

Not a bit of it.

Every sale made to people who should have been your customers was the result of persistent, consistent and insistent pushing.

Your friends and neighbors don't send their money away to Chicago or Cincinnati or St. Louis because they love the mail order concerns or because they hate you.

They don't go to the trouble of sending for catalogues and sending away their money on uncertainties simply to spite you.

Not at all.

If they buy by mail it is because the mail order man keeps hammering away at them; in every farm paper they pick up they see his announcements of wonderful, stupendous, gigantic, unparalleled and unequalled bargains! Almost every mail brings them a skillfully worded letter that attempts to persuade them that life surely will not be worth living if they don't take advantage of the last chance to get a \$200 Buggy for \$34.17! They are constantly told that the catalogue house can save them a whole lot of money—and the result of all this hammering is that they send away from home the money which ought to go to you.

Without criticising the energy or ability of the men who handle the Studebaker line, we must confess that we believe the growth of the mail order business is very largely the fault of the dealer.

Plain Truth.

The mail order man has built up his trade by being a better salesman, a larger advertiser and a more energetic pusher than the local dealer has been.

That's the plain truth of the case.

Like a more or less famous medicine, he has "worked while you have slept!" His advertisements—which are his only salesmen—are on duty 24 hours in the day and 365 days in the year.

No wonder he gets the trade!

Now, you know perfectly well that you can take a man into your store to-day, and if your stock is anything at all what it should be, you can give him a better bargain—better value for his money—than any mail order or catalogue house in existence.

You are sure of it.

But what good does it do for you to know that?

You've got to let the other fellows—the customers in your territory—know it, before the fact does you any good.

Do It Yourself.

Nobody else is going to tell them about it. You've got to do it yourself.

You must take a leaf from the successful man's method, and not only let the people know the fact that you can give them good goods and a genuine bargain, but you have to persuade them of the truth of the facts you give them, and keep reminding them of the facts again and again.

The number of jobs the other houses sell in your territory in the next 12 months depends almost entirely upon what you do to push your own goods.

You can't accomplish anything by fighting the mail order idea, but you can accomplish a whole lot by persistently, consistently and insisistently keeping your own line before your customers.

It's up to you.

The Rochester Herald in its pictorial supplement September 16, presents a number of large photographic views of interesting features connected with the recent annual outing of the employees of the Lisk Mfg. Company, Canandaigua, N. Y. This outing was held at Seneca Point, on Canandaigua Lake, September 1, and was a most enjoyable one. The attendance was very large and there were many expressions of appreciation of the liberality of the company and its interest in the welfare of its employees.

Post Office Department and Rural Free Delivery.

FROM OUR SPECIAL CORRESPONDENT.

WASHINGTON, D. C., September 25, 1906.

HARDWARE retailers in the West have recently been much disturbed as the result of dispatches sent out from Washington announcing that the Post Office Department has issued a circular requiring letter boxes on rural free delivery routes to be numbered and permitting the delivery of mail addressed to box number only. It is stated in these dispatches that the new regulation will be of enormous advantage to the mail order houses, as it will permit them to send their catalogues and advertising matter throughout the sections covered by the rural routes without the expense incident to collecting names and addresses, which heretofore has operated as a check upon this particular form of catalogue house activity. The report has, however, been officially declared erroneous so far as the feature of delivery of mail matter by box number only is concerned. The news will be welcome not only to the Hardware retailers, but to merchants in all lines doing business in rural communities.

Would Benefit Catalogue Houses and Work Injury to Merchants.

Readers of *The Iron Age* will remember that about a year ago the Post Office Department issued a circular letter of instructions to postmasters from whose offices rural routes radiated requiring them to have all letter boxes thereon numbered and permitting carriers to deliver mail addressed to box number only. Subsequently in correspondence with postmasters, authority was given to them to furnish all applicants with the number of routes radiating from each office and the number of boxes thereon. This regulation if put into force would have enabled the mail order houses to place their catalogues and advertising matter in the hands of every patron of the rural service throughout the country at the expense of a few thousand postal cards addressed to postmasters and the necessary postage on the catalogues. The retail merchants of the country, led by the Hardware trade, rose up like one man and protested against this order. *The Iron Age* took the matter up with characteristic vigor and presented strong arguments against the proposed change, which were carefully read by the Post Office Department authorities, and which were very influential in bringing about the suspension of that portion of the order relating to the delivery of mail matter by box number only. At the time the order was suspended it had not gone into force, and while the regulation has never been formally rescinded, its suspension has been regarded by the postal authorities as permanent. The Department is now in possession of a series of elaborate reports by special agents who interviewed merchants in all lines in various sections of the country, and who reported that the opinion was practically unanimous that the regulation would be of enormous benefit to the catalogue houses and would work corresponding injury to every class of retailers.

Department Simply Completing the Numbering of Boxes.

The recent erroneous reports with regard to the revival of the suspension order are based upon efforts which the Department is making to complete the work of numbering letter boxes on rural routes. There is no possible objection on the part of retailers to this feature of the original order, and it has been found of great convenience to the Department. Acting under the unrevoked provisions of the original order the work of numbering proceeded rapidly in nearly all sections. In a few cases, however, it was neglected, and it was for the purpose of completing the numbering on all routes that the recent order was issued. Superintendent Spilman of the Rural Free Delivery Service is the authority of the correspondent of *The Iron Age* for the statement that the Post Office

Department is merely completing the numbering of boxes for administrative convenience and does not contemplate permitting the delivery of mail matter addressed to box number only.

Two Recommendations by Post Office Officials.

The Post Office Department officials have begun to prepare their annual reports, which will be laid before Congress when it reconvenes in a little more than 60 days. Two highly important recommendations adverse to the interests of retail merchants will be embraced therein. First Assistant Postmaster-General Hitchcock will strongly urge the passage of a post check currency bill, while Third Assistant Postmaster-General Madden will renew his recommendation for the consolidation of third and fourth class mail matter at the third-class rate, which would operate to reduce the postage on merchandise from 16 to 8 cents per pound.

A Public "Demand," Says Mr. Hitchcock.

Mr. Hitchcock's recommendation will be based upon the special report which he made to the House and Senate post office committees while the annual post office appropriation bill was under consideration in the closing days of the last session. This report was accompanied by a bill fully described in this correspondence at the time. He emphasized what he called the "demand" of the public for a safe method of sending small sums through the mails that would be more convenient than the money order, but he gave no data as to the form in which this demand had been made manifest. At a hearing before the House and Senate post office committees on the subject of postal currency the only parties to appear were the patentee of the so-called post check and the members of his paid lobby in Washington. The impression made upon the committee was not particularly strong, and as the hearing was promptly followed by a flood of protests from merchants in all lines throughout the country it was decided to drop the matter.

General Madden's Consolidation Project

has received more or less attention for the past dozen years and on several occasions has found its way into the annual appropriation bill, but has always been stricken out before the final passage of that measure. At the last session it was rejected on two grounds—first, that at the outset it would create an additional deficit in the postal revenues of between \$2,000,000 and \$3,000,000, and, second, that aside from cutting the postage bills of the big catalogue houses in two it would be of very little advantage to any one. In view of the apparent anxiety of the Post Office Department to reduce the current deficit the recommendation of the consolidation scheme occasioned some surprise at both ends of the Capitol, but the project received very little support and was promptly rejected by both House and Senate committees.

W. L. C.

CHAS. A. SCHIEREN & Co., New York City, are erecting a 10-story modern factory building of steel construction and concrete fireproofing, adjoining the Schieren Building, covering numbers 61, 63 and 65 Cliff street. The building will be 68 x 125 ft. in size, with light on three sides, and in addition a 25 x 60 ft. court on the north side, with floor levels the same as in the Schieren Building. The structure will be equipped with electric elevators, while electric power and light will be supplied tenants from power in the Schieren Building. The building will also have an entrance on Beekman street through an alley. The new structure will be known as the Chapel Court Building, as it will occupy the site of St. George's Chapel of Colonial days. Leases are being made on the basis of occupancy May 1, 1907.

NEW YORK BELTING COMPANY, 51 Beekman street, New York, is about increasing its capacity for the manufacture of Leather Belting by the addition of a large new plant located at the above address, where hydraulic power presses are being installed.

STIMULATING SALESMEN'S EFFORTS.

SINCE July 1 the salesmen of the Norvell-Shapleigh Hardware Company, St. Louis, Mo., have been engaged in a stirring contest for supremacy. A number of the runners engaged in the "Great Diamond Edge Derby," illustrated herewith, have already passed under the wire, and the indications are that the 31 prizes, into which the purse of \$500 has been divided, will have been awarded before the end of September.

The race was conceived by the company to stimulate its Cutlery sales during the summer months and all of its 146 salesmen were entered. The flag was dropped on July 1 and the first prize winner finished early in August. Cutlery sales aggregating \$2000 constituted the length of the course, and the orders of the first four winners totaled \$8729 on August 15. To further the interest in the contest charts were published on the 1st and 15th of each month on which a circular track was reproduced divided into 20 sections. Each of these 20 sections represented sales amounting to \$100, and the positions of

"Don't leave your trunk at the depot; take it to your customer's store; open it up and start your order with cutlery."
 "The matter of selling cutlery is 75 per cent. in showing samples and 25 per cent. in everything else combined."
 "Selling cutlery is not a matter of territory; it is a personal matter."
 "Selling cutlery is largely habit—a very good habit to acquire."
 "The idea that selling cutlery will reduce your other sales is not shown by the returns."

REQUESTS FOR CATALOGUES, &c.

The trade is given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c. relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM IDAHO HARDWARE COMPANY, Idaho Falls, Idaho, which has been incorporated with a capital stock of \$50,000. The company has succeeded the Griffith Hardware & Plumbing Company, and will do a jobbing as well as

\$2,000.00 Cutlery Sales

GRAND FIRST PRIZE.....	\$ 50.00
10 SECOND PRIZES (\$25.00).....	\$625.00
20 THIRD PRIZES (\$10.00).....	\$200.00
GRAND TOTAL.....	\$950.00

SEE GENERAL LETTER FOR CONDITIONS OF RACE.

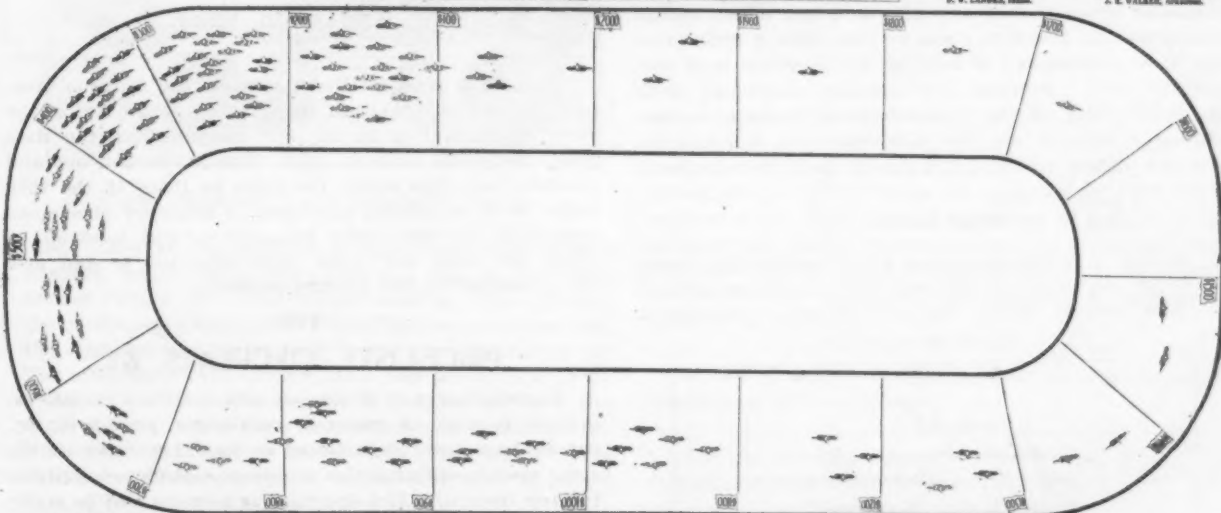
GREAT DIAMOND EDGE DERBY

FOR RUNNERS OF ALL AGES AND CONDITIONS.

THESE FOUR RIDERS HAVE PASSED UNDER THE WIRE



A. C. RAY, Minneapolis, Minn.
 W. E. THOMSON, Idaho Territory.
 J. E. ADAMS, Georgia.
 J. S. WISE, Colorado.
 R. V. LANDER, Idaho.
 GERALD WARE, Alabama.
 E. W. WISE, Colorado.
 E. L. BICK, Maryland.
 A. F. WILSON, Missouri.
 A. E. VALLEY, Indiana.



The \$50.00 prize and three \$25.00 prizes have been won.
 There are still seven \$25.00 prizes and twenty \$10.00 prizes.
 A. C. RAY is nearest under the wire.
 W. E. THOMSON was slow and lost a week's time.
 J. E. ADAMS is coming like a whirlwind.
 J. S. WISE made a big jump forward.
 R. V. LANDER is riding with whip and spur.
 GERALD WARE has just sent in one cutlery order of \$750.00.



The four leaders have sold \$8,729.00 to August 15th.
 The forty-six last orders sold \$8,726.00 to August 15th.
 THREE black horses and ONE white horse are winners.
 The most fast, etc. are black horses, four white.
 New Mexico, Minnesota, Texas and Montana are winners.
 Selling cutlery is not a matter of territory, it is a PERSONAL matter.
 Selling cutlery is largely a habit—a very good habit to acquire.
 The catalogue salesman sells little cutlery.
 The lazy, easy-going salesman sells no cutlery prizes.
 You can't sell cutlery without going to the trouble of showing samples.
 The idea that selling cutlery will reduce your other sales is not shown by the returns.

ALL GOODS IN CUTLERY DEPARTMENT SHIPPED AND BILLED UP TO AUGUST 15th.

Chart of the Great Diamond Edge Derby.

the contestants as the race progressed were indicated by numbered runners corresponding to the number assigned each entry, as shown in the accompanying illustration. The black horses were the salesmen in the Southern States, while the white horses travel through the Northern States. The purse was divided as follows: One grand first prize, \$50; 10 second prizes, \$25 each, and 20 third prizes, \$10 each.

That the contest has stimulated sales and has spurred the house's representatives to greater efforts than ever before attained is shown by the record total of Cutlery orders booked since July 1. Each salesman was provided with a complete line of Cutlery samples, and it has been found that sales are more easily made from the display of goods than from the catalogue.

That the first prize winner has not let up in his efforts is shown by his continued heavy sales, and had he been permitted to travel the course the second time he would have passed the 85 tall end men on September 1. Suggestions for the contestants were also printed on each chart, and some of the more pertinent follow:

"Talk cutlery every day. Show samples. You can't sell cutlery from the catalogue."

retail business in Hardware, House Furnishings, Paints and Oils, Electrical Supplies, Stoves, Sporting Goods, Plumbing Materials, Steam, Hot Water and Hot Air Heating, Mill Supplies, &c.

FROM E. P. CONNET, who has bought out the Hardware, Stove, Paint and Sporting Goods business of T. V. Weinhold, Horton, Kan.

FROM CRANE & MILLIGAN, who have just opened up in business at 54 and 56 Mechanic street, Newark, N. J., handling, at wholesale and retail, Shelf and Heavy Hardware, Agricultural Implements, Paints and Oils, Pipe and Fittings, Mill Supplies, &c. The members of the new firm have been identified with Roe & Conover, of Newark, for a number of years and are thus well qualified by experience in the above lines. Special attention will be given to Engineers' Supplies, of which a very complete stock will be carried.

Edward Woehler has succeeded to the Hardware business of Woehler Bros., Zearing, Iowa.

BACK ORDER SYSTEM OF J. A. VAN WINKLE COMPANY.

BY courtesy of J. A. Van Winkle Company, Paterson, which is recognized as one of the leading Hardware houses in northern New Jersey, we are enabled to describe and illustrate the method of handling back orders employed in its establishment. The system is not a complicated one, but embodies a unique feature in its

July 25			
101		6 Pkgs. #24 Cable Laid Twine	

Fig. 1.—Entries in the City Order Book.

scheme of numbering customers' accounts, which are numerically grouped alphabetically, so to speak. All accounts are numbered in hundreds, all names beginning with A coming in the 100 group. Names beginning with B come in the 200's, C in the 300's, and so on up to Z, which, of course, is represented by 2600. Thus the number of an account indicates the letter with which the name begins and vice versa. This not only facilitates looking up names or numbers, but also affords a key which causes the memory to associate them, so that after a little practice it is unnecessary to look up the accounts most frequently used. Johnson, for example, beginning with the tenth letter of the alphabet, would have a number beginning with 10, and the mind has only to recall the last two figures, which it will readily do if the number is often referred to.

Order Books.

In Fig. 1 is reproduced an entry in the City Order Book, in which all orders received by 'phone or call are first written down. The second item, 1 Bundle $\frac{3}{4}$

July 24			
101		6 Pkgs. #24 Cable Laid Twine	
		1 Bundle $\frac{3}{4}$ x $\frac{1}{2}$ Band Iron	

Fig. 2.—Back Order Entry Carried to the Special Order Book.

x $\frac{1}{2}$ Band Iron, was filled promptly from stock, being checked with a V when shipped out and cross checked when charged. The first item, 6 packages No. 24 Cable Laid Twine, could not be supplied from stock, and was marked O in the check column by the shipper, who has charge of all orders. His next procedure is to enter it in what is called the Special Order Book, after which he draws the lines above and below the O, showing that the item has been attended to.

The entry in the Special Order Book is reproduced in Fig. 2, the customer's number, according to the alpha-

NAME Alphano Co.		No. 101	
ADDRESS Blank street			
ORDER NO.	DATE	QUANTITY	DESCRIPTION
101		6 Pkgs. #24	Cable Laid Twine

Fig. 3.—Entry in Back Order Sheet.

betical system already explained, being added in the check column by the shipper. The buyer's initials, affixed when an order is placed, show that such attention has been given. The following foot note appended to the

order instructs the manufacturer to place the customer's number—in this case 101—on the package and invoice:

101

This number must appear on package and invoice.

This could of course be stamped on the order, but it is believed that the typewritten instructions are better calculated to receive attention.

A back order sheet, Fig. 3, is written up at this time and filed alphabetically in a loose leaf binder.

On Receipt of the Goods

the shipper knows from the number on the package that some of them at least are to go out on a back order, and guided by the hundreds figure, as explained at the opening of this article, looks under A in the index of the back order binder and finds that the number is that of Alphano Company. The index, which is typewritten, appears as follows:

100	Abbott, H. M.
101	Alphano Company
102	Andrews & Company
103	Appleton Bros.

Turning to the back order sheet of the Alphano Company the shipper lays out the quantity called for, at the same time entering in the left hand margin the date when the goods came in. The item is checked out and charged from this entry, the same as items in the City Order Book, as already explained. Customers' sheets can remain in the back order file until entirely used up, as items are lined out when fully attended to and new items coming up are entered below.

PRICE-LISTS, CIRCULARS, &c.

Manufacturers in Hardware and related lines are requested to send us copies of catalogues, price-lists, &c., for our catalogue department in New York and at the same time to call attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

NATIONAL CUTLERY COMPANY, Detroit, Mich.: Catalogue of "S. & S." Cold Chisels, Cape Chisels, Calking Tools, Boiler Makers' Tools, &c. These tools are described as made from the company's special formula octagon cold chisel steel, thoroughly hand forged and specially tempered and are fully warranted.

WILSON TOASTER MFG. COMPANY, Pittsburgh, Pa.: Circulars referring to Bread Toasters and Towel Holders.

HALL-ROBERTSON HARDWARE COMPANY, Fargo, N. D.: Leaves referring to Stoves and Ranges for insertion in the company's large loose leaf catalogue.

ACME WASHING MACHINE COMPANY, Columbus, Ohio: "Wash Day Comfort," an illustrated catalogue and price-list of Acme Washing Machines and Clothes Wringers.

MARSHALL-WELLS HARDWARE COMPANY, Duluth, Minn.: Catalogue of Brushes for season of 1907.

NEW CASTLE STAMPING COMPANY, New Castle, Pa.: Catalogue No. 4 referring to New Castle Enameled Ware, with circulars calling attention to special assortments, &c.

MILBRADT MFG. COMPANY, St. Louis, Mo.: Catalogue No. 24 referring to Milbradt Rolling Step Ladders and Track.

CASSADY-FAIRBANK MFG. COMPANY, Chicago, Ill.: Catalogue listing a large line of Hardware Specialties, including Nut Cracks and Pick Sets, Screw Drivers, Towel and Clothes Racks, Kitchen Sets, Curling Irons, &c.

MISCELLANEOUS NOTES.

Ohio Tool Company.

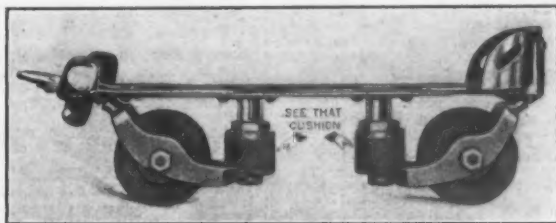
Among new goods included in a recent catalogue of the Ohio Tool Company are a number of adjustable planes and scrapers. A complete line of socket firmer butt chisels with 3½-in. blades has also been added, both in regular packages and in fancy sets in hardwood boxes.

Improved Canary Bird Cages.

Among improvements shown in the 1906 bird cage catalogue of O. Lindemann & Co., 35-37 Wooster street, New York, are brass molding bottoms, with heavy zinc drawers on brass canary bird cages. This is referred to as a new departure in connection with small cages and a very desirable improvement. Verde Antique, a brass and green finish, is another new feature and characterizes a line of brass cages. It is alluded to as a very pleasing and attractive finish.

The Richardson Expert Two-Roller Skate.

The skate shown herewith has but two rollers, these being of aluminum, 2½ in. in diameter by 1¼ in. on the



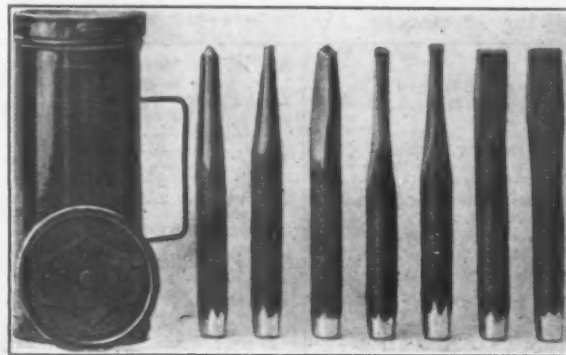
The Richardson Expert Two-Roller Skate.

face. They are mounted on roller carriers with outside hangers, which carry the axles, one end of the roller carrier resting on a large rubber cushion. This provides the oscillating action which is obtained in connection with the Richardson four-wheeled skate, also preventing jar. The other end of the carrier has a free action in a pocket attached to the foot plate. It is pointed out that this skate permits of the same movements and evolutions, including the describing of curves and circles, which can be executed with the four-roller skate. The skate is put on

the market by Richardson Ball Bearing Skate Company, 501 Wells street, Chicago, Ill.

The Mueller Handy Tool Kit.

H. Mueller Mfg. Company, Decatur, Ill., and 254-258 Canal street, New York, is offering the handy tool kit, shown herewith, grouped in a strong, neat compartment box, for convenience in keeping and carrying. The kit is designed especially for the plumber, gasfitter and waterworks man. It consists of a center punch, round punch, diamond point chisel, cape chisel, cold chisel and a combination calking chisel, arranged in a serviceable compartment box, having the top and bottom lined with



The Mueller Handy Tool Kit.

sole leather, to prevent injury to the tools or box. The box has a strong swiveled handle, and the top is removed by a half turn to prevent it jarring loose or giving away. All the tools are made of high-grade ⅝-in. octagon steel, tempered and hardened at measured temperatures, to insure absolute uniformity of temper. Both the tools and the box are stamped with the manufacturer's trademark, and every tool has the Mueller unconditional guarantee.

Wileys Company, Macksville, Kan., has purchased the business of Cully & Reed.

Lee A. Johnson Company, Sunnyside, Wash., has opened a branch store in Outlook, Wash.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—

Linseed, City, raw.....	36	@39
City, Boiled.....	40	@41
State and Western, raw.....	37	@38
Raw Calcutta Seed.....	38	@39
Lard, Extra Prime, Winter.....	40	@41
Extra No. 1.....	46	@47
No. 1.....	40	@44
Cotton-seed, Crude, f.o.b. mills.....	22	@23
Summer Yellow, Prime.....	37	@38
Summer Yellow, off grades.....	36	@37
Sperm, Crude.....	53	@54
Natural Spring.....	50	@51
Bleached Spring.....	52	@53
Natural Winter.....	43	@44
Bleached Winter.....	45	@46
Bleached Winter, Extra.....	46	@47
Tallow, Prime.....	51	@52
Whale, Crude.....	32	@33
Natural Winter.....	43	@44
Bleached Winter.....	45	@46
Menhaden, Brown, Strained.....	26	@27
Light, Strained.....	27	@28
Bleached, Winter.....	28	@29
Extra Bleached, Winter.....	29	@30
Southern.....	29	@30
Cocconut, Ceylon.....	74	@75
Cochin.....	30	@31
Cod, Domestic, Prime.....	30	@31
Newfoundland.....	35	@36
Red, Elaine.....	37	@38
Red, Saponified.....	37	@38
Olive, Italian, bbls.....	55	@56
Neatfoot, Prime.....	48	@49
Palm, Logos.....	64	@65

Mineral Oils—

Black, 29 gravity, 25@30 cold test.....	19	@20
29 gravity, 15 cold test.....	11	@12
Summer.....	10	@11
Cylinder, light filtered.....	18	@19
Dark filtered.....	16	@17
Paraffine, 903-907 gravity.....	13	@14
903 gravity.....	12	@13
903 gravity.....	10	@11
Red.....	12	@13

Miscellaneous—

Barytes:		
White, Foreign.....	10	@11
Amer. floated.....	10	@11
Off color, No. 2.....	10	@11
Chalk, in bulk.....	3	@4
In bbls.....	100	@101
China Clay, English.....	10	@11
Cobalt, Oxide.....	100	@101
Whiting, Commercial.....	100	@101
Gilders.....	100	@101
Ex. Gilders.....	100	@101
Putty, Commercial.....	100	@101
In bladders.....	1.70	@1.71
In bbls. or tubs.....	1.20	@1.21
In 1 lb. to 5 lb. cans.....	2.05	@2.06
In 12½ to 50 lb. cans.....	1.50	@1.51
Spirits Turpentine.....	gal.	
In Oil bbls.....	64	@65
In machine bbls.....	64	@65
Glue.....		
Cabinet.....	11	@12
Common Bone.....	7	@8
Extra White.....	18	@19
Foot Stock, White.....	11	@12
Foot Stock, Brown.....	8	@9
German Hide.....	12	@13
French.....	10	@11
Irish.....	13	@14
Low Grade.....	9	@10
Medium White.....	11	@12
Gum Shellac.....	47	@48
Bone Dried.....	57	@58
Button.....	40	@41
Diamond I.....	54	@55
Fine Orange.....	50	@51
A. C. Garnet.....	47	@48
D. C.....	58	@59
Octagon B.....	62	@63
T. N.....	60	@61
V. S. O.....	65	@66
Colors in Oil.....		
Black, Lampblack.....	12	@13
Blue, Chinese.....	36	@37
Blue, Prussian.....	32	@33

Blue, Ultramarine.....	13	@14
Brown, Vandyke.....	11	@12
Green, Chrome.....	12	@13
Green, Paris.....	21	@22
Sienna, Raw.....	12	@13
Sienna, Burnt.....	12	@13
Umber, Raw.....	11	@12
Umber, Burnt.....	11	@12

White Lead, Zinc, &c.—

Lead, English white, in Oil.....	9	@10
Lead, American white, in Oil.....	9	@10
Lots of 500 lb. or over.....	8	@9
Lots less than 500 lb.....	8	@9
In Barrels.....	8	@9
Lead, White, in oil, 25 lb tin pails, add to keg price.....	8	@9
Lead, White, in oil, 12½ lb tin pails, add to keg price.....	8	@9
Lead, White, in oil, 1 to 5 lb as'ed tins, add to keg price.....	11	@12
Lead, American, Terms: For lots 13 tons and over ¼¢ rebate; and 2¢ for cash if paid in 15 days from date of invoice; for lots of 500 lbs. and over 2¢, for cash if paid in 15 days from date of invoice, for lots of less than 500 lbs. net.....	8	@9
Lead, White, Dry, in bbls.....	6	@7
Zinc, American, dry.....	5	@6
Zinc, French.....	5	@6
Antwerp, Red Seal, dry.....	5	@6
Antwerp, Green Seal, dry.....	10	@11
Paris, Red Seal, dry.....	9	@10
Paris, Green Seal, dry.....	11	@12
Zinc, V. M. French, in Poppy Oil.....	13	@14
Green Seal.....	13	@14
Lots of 1 ton and over.....	13	@14
Lots of less than 1 ton.....	13	@14
Zinc, V. M. French, in Poppy Oil.....	13	@14
Red Seal.....	13	@14
Lots of 1 ton and over.....	13	@14
Lots of less than 1 ton.....	13	@14
Discounts—French Zinc—Discounts to buyers of 10 bbl. lots of one or mixed grades. 1%: 25 bbls., 2%; 50 bbls., 4%.		
Dry Colors.....		
Black, Carbon.....	5	@6
Black Drop, American.....	4	@5
Black Drop, English.....	5	@6

Black, Ivory.....	15	@16
Lamp, Com.....	4	@5
Blue, Celestial.....	4	@5
Blue, Chinese.....	29	@30
Blue, Prussian.....	27	@28
Blue, Ultramarine.....	4	@5
Brown, Spanish.....	1	@2
Carmine, No. 49.....	32	@33
Green, Chrome, ordinary.....	17	@18
Green, Chrome, pure.....	17	@18
Lead, Red, bbls., ½ bbls. and kegs:		
Lots 500 lb. or over.....	7	@8
Lots less than 500 lb.....	7	@8
Litharge, American, bbls.....	7	@8
Ocher, American.....	10	@11
American Golden.....	2	@3
French.....	14	@15
Foreign Golden.....	3	@4
Orange Mineral, English.....	18	@19
French.....	10	@11
German.....	8	@9
American.....	8	@9
Red, Indian, English.....	4	@5
American.....	3	@4
Red, Turkey, English.....	1	@2
Red, Tuscan, English.....	7	@8
Red, Venetian, Amer.....	100	@101
English.....	100	@101
Sienna, Italian, Burnt and Powdered.....	3	@4
Italian, Raw, Powdered.....	3	@4
American, Raw.....	1	@2
American Burnt and Pow.....	1	@2
Talc, French.....	10	@11
American.....	10	@11
Terra Alba, French.....	100	@101
English.....	100	@101
American.....	100	@101
American.....	100	@101
Umber, T'key, Bnt. & Pow.....	2	@3
Turkey, Raw and Powdered.....	2	@3
Burnt, American.....	1	@2
Raw, American.....	1	@2
Yellow Chrome.....	12	@13
Vermilion, American Lead.....	10	@11
Quick-silver, bulk.....	6	@7
Quick-silver, bars.....	6	@7
English, Import.....	65	@66
Chinese.....	30	@31

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33% @ 33% & 10% signifies

that the price of the goods in question ranges from 33% per cent. discount to 33% and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1906, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Domestic, $\frac{1}{2}$ doz. \$3.00.....33%
North's.....10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....35%
Taplin's Perfection.....35%

Ammunition.—See Caps, Cartridges, Shells, &c.

Anvils—American—

Eagle Anvil..... $\frac{1}{2}$ D. 1 at \$4
Hay-Budden, Wrought..... $\frac{1}{2}$ D. 1 at \$4
Trenton..... $\frac{1}{2}$ D. 1 at \$4

Imported—

Peter Wright & Sons, $\frac{1}{2}$ D. 84 to 349
lb. 11¢; 350 to 600 lb. 11¢

Anvil, Vise and Drill—

Millers Falls Co., 11¢. 9¢.....15¢10%

Apple Parers—See Parers,

Apple, &c.

Aprons, Blacksmiths—

Livingston Nail Co.....33%

Augers and Bits—

Com. Double Spur.....75¢75¢5%

Jennings' Patin., reg. finish.....50¢10¢60%

Black Lip or Blued.....60¢10%

Boring Mach. Augers.....70¢10%

Car Bits, 12-in. twist.....50¢10%

Ford's Auger and Car Bits.....40¢5%

Fortner Pat. Auger Bits.....40¢5%

C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list.....25%

No. 20, R. Jennings' list.....40¢7%

Russell Jennings.....25¢10¢2%

L'Hommiedieu Car Bits.....12%

Miller's Countersink Bits.....45¢7%

Pugh's Black.....25%

Pugh's Jennings' Pattern.....35%

Snell's Auger Bits.....60%

Snell's Bell Hangers' Bits.....60%

Snell's Car Bits, 12-in. twist.....60%

Snell's King Auger Bits.....50%

Wright's Jennings' Bits.....50%

Bit Stock Drills—

See Drills, Twist.

Expensive Bits—

Clark's small, 18; large, 35.....50¢10%

Clark's Pattern, No. 1, $\frac{1}{2}$ doz. 25¢
No. 2, 18.....60¢10¢10%

Ford's, Clark's Pattern.....60%

C. E. Jennings & Co., Steer's Pat. 25¢
Lavigne Pat., small size, 18; 10; large
size, 35, 60.....70¢10%

Strauss.....60%

Gimlet Bits—

Common Dble. Cut.....\$3.00@3.25

German Pattern, Nos. 1 to 10,
\$4.60; 11 to 13, \$5.75

Hollow Augers—

Bosney Pat., per doz. \$5.50@6.00

Ames.....25¢10%

Universal.....25%

Wood's Universal.....25%

Ship Augers and Bits—

Ship Augers.....45¢5%

Ford's.....35¢5%

C. E. Jennings & Co.:
L'Hommiedieu's.....15%

Watrous'.....35¢5%

Snell's.....40%

Awl Hatts—See Handles,

Mechanics' Tool.

Awls—

Brad Awl:
Handled.....gro. \$2.75@3.00

Unhanded, Shlivered.....gro. 65¢66¢

Unhanded, Patent.....gro. 60¢70¢

Peg Awl:
Unhanded, Patent.....gro. 31¢34¢

Unhanded, Shlivered.....gro. 65¢70¢

Scratch Awl:
Handled, Com.....gro. \$3.50@4.00

Handled, Socket.....gro. \$11.50@12.00

Awl and Tool Sets—See

Sets, Awl and Tool.

Axes—

Single Bit, base weights:
First Quality.....\$1.75@5.00

Second Quality.....\$1.25@4.50

Double Bit, base weights:
First Quality.....\$7.00@7.50

Second Quality.....\$6.50@6.75

Axle Grease—

See Grease, Axle

Axles—

Iron or Steel
Concord, Loose Collar.....\$4.40@5.40

Concord, Solid Collar.....\$4.40@5.40

No. 1 Common, Loose.....\$3.40@5.40

No. 1 1/4 Com., New Style 3% @ 4 1/4¢

No. 2 Solid Collar.....40¢4 1/4¢

Half Patent:
Nos. 7, 8, 11 and 12.....75¢75¢5%

Nos. 13 to 14.....70¢10¢75¢5%

Nos. 15 to 18.....75¢10¢75¢10¢5%

Nos. 19 to 22.....75¢10¢75¢10¢5%

Boxes, Axle—

Common and Concord, not turned
lb., 1/2¢5¢

Common and Concord, turned,
lb., 5/4¢6¢

Half Patent.....lb., 8/4¢9¢

Bait— Fishing—

Hendryx:
A Bait.....20%

B Bait.....25%

Competitor Bait.....20¢5%

Balances— Sash—

Caldwell new list.....50%

Pullman.....50¢10¢60%

Spring—

Spring Balances.....50¢10¢60%

Chatillon's:
Light Spg. Balances.....50¢10%

Straight Balances.....40¢50%

Circular Balances.....50¢10%

Large Dial.....30%

Barb Wire—See Wire, Barb.

Bars— Crow—

Steel Crowbars, 10 to 40 lb.,
per lb., 3/4¢3 1/4¢

Towel

No. 10 Ideal, Nickel Plate..... $\frac{1}{2}$ gro. \$4.50

Beams, Scale—

Scale Beams.....40¢10¢50%

Chatillon's No. 1.....30%

Chatillon's No. 2.....40%

Beaters, Carpet—

Holt-Lyon Co.:
No. 13 Wire Tinned $\frac{1}{2}$ doz. \$2.75

No. 12 Wire Tinned $\frac{1}{2}$ doz. \$0.75

Tinned.....\$0.85

No. 11 Wire Coppered $\frac{1}{2}$ doz. \$1.10

Tinned.....\$1.20

No. 10 Wire Galvanized $\frac{1}{2}$ doz. \$1.50

Western W. G. Co.:
No. 1 Electric..... $\frac{1}{2}$ gro. \$7.50

No. 2 Buffalo..... $\frac{1}{2}$ gro. \$9.00

No. 3 Perfection Dust..... $\frac{1}{2}$ gro. \$8.00

Egg—

Holt-Lyon Co.:
Holt, per doz., No. 5, \$0.80; No. 1,
Jap'd, \$1.15; No. 1, Tin'd, \$1.40;

No. B, Jap'd, \$1.40; No. 2, Tin'd,
\$1.85; No. 4, \$1.60.

Lyon, Jap'd, per doz., No. 2,
\$1.35; No. 3, \$1.50.

Taplin Mfg. Co.:
Improved Dover, per gro., No. 60,
\$4.00; No. 75, \$5.50; No. 100, \$7.00;

No. 102, Tin'd, \$8.50; No. 150,
Hotel, \$15.00; No. 152, Hotel
Tin'd, \$17.00; No. 200, Tumbler,
\$35.00; No. 202, Tumbler Tin'd,
\$35.00; No. 300, Mammoth, per
doz., \$25.00.

Turner & Seymour Mfg. Co.:
T. & S. Dover.....\$5.00

Western W. G. Co. Buffalo.....\$7.00

Wonder (R. M. Co.) $\frac{1}{2}$ gro. net, \$6.00

Bellows—

Blacksmith, Standard List.....
60¢10¢80¢10¢5%

Hand—

Inch.....6 7 8 9 10

Doz.....\$1.75 5.70 6.85 7.60 8.85

Molders—

Inch.....9 10 11 12 14

Doz.....\$8.00 9.00 10.50 12.50 14.50

Bells— Cow—

Ordinary Goods.....75¢5¢75¢10¢5%

High grade.....70¢10¢75%

Jersey.....75¢10%

Texas Star.....50%

Door—

Abbe's Gong.....45%

Barton Gong.....50%

Home R. & F. Mfg. Co.....55¢10%

Trip Gong.....50¢10¢50¢10¢5%

Yankee Gong.....55%

Hand—

Polished, Brass.....60¢10%

White Metal.....40%

Nickel Plated.....50¢10¢60%

Swiss.....60¢10¢75%

Cone's Globe Hand Bells.....35¢25%

Silver Chime.....35¢25%

Miscellaneous—

Farm Bells.....lb. \$1.40

Church and School.....50¢10¢60%

American Tube & Stamping Co.
Gongs.....15%

Table Call Bells.....50¢50¢10%

Belting— Leather—

Extra Heavy, Short Lap.....60¢5%

Regular Short Lap.....60¢10¢5%

Standard.....70%

Light Standard.....70¢5%

Cut Leather Lacing.....45¢50%

Leather Lacing Sides, per sq. ft.,
25¢

Rubber—

Agricultural (Low Grade).....
75¢75¢5%

Common Standard.....70¢70¢10%

Standard.....60¢5¢60¢10%

Extra.....60¢5¢60¢5%

High Grade.....50¢5¢50¢10%

Bench Stops—

See Stops, Bench

Benders and Upsetters,

Tire—

Detroit Perfected Tire Bender.....40%

Detroit Stoddard's Lightning Tire
Upsetters, No. 1, \$1.25; No. 2, \$7.25;

No. 3, \$10.50; No. 4, \$14.25; No. 5,
\$20.50.

Green River Tire Benders and Up-
setters.....20%

Bicycle Goods—

John S. Leng's Son & Co.'s 1906 list:
Chain, Parts, Spokes.....50%

Tubes.....60%

Bits—

Auger, Gimlet, Bit Stock Drills,
&c.—See Augers and Bits.

Blocks— Tackle—

Common Wooden.....70¢10¢75%

Hartz St. Tackle Blocks.....50¢50¢5%

B. & L. B. Co.:
Boston Wood Snatch, 50%; Eclipse
Steel, 75%; Hollow Steel, 50¢10%;

Star Wire Rope, 50%; Tarbox Metal
Snatch, 50%; Tarbox New Style
Steel, 50¢10%; Wire Rope Snatch,
50%;

Lane's Patent Automatic Lock and
Junior.....30%

Stowell's Novelty, Mal. Iron.....50%

Stowell's Loading.....50¢10%

See also Machines, Hoisting.

Boards, Stove—

Zinc, Crystal, &c.....40%

Paper Embossed.....40¢10%

Boards, Wash—

See Washboards.

Bobs, Plumb—

Keuffel & Esser Co.....\$8.35

Boils—

Carriage, Machine, &c.—
Common Carriage (cut thread):
% X 6 and smaller.....75¢—%

Larger and Longer.....
60¢10¢60¢10¢5%

Phila. Eagle \$3.00 list May 21, '99
40%

Bolt Ends.....65¢65¢5%

Machine, % X 4 and smaller.....
75¢—%

Machine, larger and longer.....
65¢65¢5%

Door and Shutter—

Cast Iron Barrel, Japaned,
Round Brass Knob:
Inch.....3 4 5 6 8

Per doz.....\$1.30 .35 .45 .60 .80

Cast Iron Spring Foot, Jap'd:
Inch.....6 8 10

Per doz.....\$1.20 1.50 2.25

Cast Iron Chain, Flat, Japaned:
Inch.....6 8 10

Per doz.....\$1.00 1.40 1.65

Cast Iron Flat Shutter, Jap'd,
Square Knobs:
Inch.....6 8 10

Per doz.....\$0.75 .95 1.25

Wrought Barrel Jap'd.....80¢80¢10

Gautier, Blunt, 4 1/4 c; Sharp, 1 1/4 c 4 1/4 c
Perkins, Blunt, 1/2 lb, 3.65 c; Sharp, 4.15 c

Can Openers— See Openers, Can.

Cans, Milk—

Illinois Pattern.....1.35 1.85 2.35 each.
New York Pattern.....1.50 2.20 2.45 each.
Baltimore Pattern.....1.50 2.20 2.45 each.
Dubuque.....1.35 1.60 1.75 each.

Cans, Oil—

Buffalo Family Oil Cans:
3 10 gal. \$18.00 60.00 120.00 gro., net.

Caps, Percussion—

Eley's E. B.52¢ 55¢
G. D.per M 34¢ 35¢
F. L.per M 40¢ 41¢
G. E.per M 48¢ 50¢
Musketper M 62¢ 64¢

Primers—

Berdan Primers, \$2 per M.....30%
B. L. Caps (Sturtevant Shells)
\$2 per M.....30%
All other primers per M \$1.52 to \$1.60

Cartridges—

Blank Cartridges:
32 O. F., \$5.50.....10¢ 10¢
32 O. F., \$7.00.....10¢ 10¢
22 cal. Rim, \$1.50.....10¢ 10¢
32 cal. Rim, \$2.75.....10¢ 10¢
B. B. Caps, Con. Ball, \$1.50.....10¢ 10¢
B. B. Caps, Round Ball, \$1.10.....10¢ 10¢
Central Fire.....10¢ 10¢
Target and Sporting Rifle.....15¢ 15¢
Primed Shells and Bullets.....15¢ 15¢
Rim Fire, Sporting.....15¢ 15¢
Rim Fire, Military.....15¢ 15¢

Casters—

Bed70¢ 70¢ 10¢
Plate60¢ 10¢ 60¢ 10¢ 45¢
Philadelphia75¢ 75¢ 10¢
Acme, Ball Bearing.....32¢ 32¢
Boss Anti-Friction.....70¢ 70¢
Gem (Roller Bearing).....30¢ 30¢
Martin's Patent (Phoenix).....40¢ 40¢
Standard Ball Bearing.....40¢ 40¢
Tucker's Patent low list.....30¢ 30¢
Yale (Double Wheel) low list.....30¢ 30¢

Cattle Leaders—

See Leaders, Cattle.

Chain, Coil—

American Coil, Straight Link:
3-16 1/4 6-16 3/4 7-16 1/4 9-16
\$3.70 5.90 4.95 4.30 4.05 3.95 3.90
3/4 1/2 1/4 to 1 1/4 to 1 1/4 inch.
\$3.85 3.70 3.65 3.80
German Coil.....60¢ 10¢ 60¢ 10¢ 70¢

Halter—

Halter Chains.....60¢ 5¢ 60¢ 10¢
German Pattern Halter Chains,
list July 24, '97.....60¢ 10¢ 10¢
Covert Mfg. Co.....35¢ 35¢
Halter.....35¢ 35¢

Cow Ties—

See Halters and Ties.

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
6 1/2-6 3/4, Straight, with ring.....\$25.00
6 1/2-6 3/4, Straight, with ring.....\$25.00
6 1/2-6 3/4, Straight, with ring.....\$25.00
6 1/2-6 3/4, Straight, with ring.....\$25.00

NOTE—Add 2c per pair for Hooks.
Twist Traces: add per pair for Nos. 3
and 5, 2c; No. 1, 3c; No. 4, 4c to price of
Straight Link.

Eastern Standard Traces, Wag-
on Chain, &c.....60¢ 10¢

Miscellaneous—

Jack Chain, list July 10, '93:
Iron.....60¢ 10¢
Brass.....60¢ 10¢
Safety Chain.....70¢ 10¢
Gal. Pump Chain.....10¢ 10¢ 4 1/4 c
Covert Mfg. Co.:
Breast, Halter, Heel, Rein, Stal-
lion.....40¢ 40¢
Onida Community:
Am. Dog Leads and Kennel Chains.....40¢ 40¢
Niagara Dog Leads and Kennel
Chains.....40¢ 40¢
Wire Goods Co.:
Dog Chain.....70¢ 10¢
Universal Dbl.-Jointed Chain.....30¢ 30¢

Chain and Ribbon, Sash—

Onida Community:
Copper Chain, 60¢ 5%; Steel Chain,
60%
Pullman:
Bronze Chain, 60%; Steel Chain,
60¢ 10¢
Sash Chain Attachments, per set, 8¢
Alumino Sash Ribbon, per 100
ft.....\$1.25 to \$3.00
Sash Ribbon Attachments, per set, 8¢

Chalk—(From Jobbers.)

Carpenters' Blue.....gro., 40¢ 40¢
Carpenters' Red.....gro., 40¢ 40¢
Carpenters' White.....gro., 35¢ 35¢
Some jobbers sell at lower prices
than above.

Checks, Door—

Bardley's.....45%
Pullman, per gro.....\$51.00
Russwin.....40%

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools.....35%
Youths' Chests, with Tools.....40%
Gentlemen's Chests, with Tools.....30%
Farmers', Carpenters', etc., Chests,
with Tools.....35%

Machinists' and Pipe Fitters'
Chests, Empty.....30%
Tool Cabinets.....30%
C. E. Jennings & Co.'s Machinists'
Tool Chests.....35% 10%

Chisels—

Socket Framing and Firmer

Standard List.....75¢ 10¢ 75¢ 10¢ 45¢
Buck Bros.....30%
Charles Buck Edge Tool Co.....30%
C. E. Jennings & Co.:
Socket Firmer No. 10.....60%
Socket Framing No. 15.....60%
Swan's.....75%
L. & I. J. White Co.....30% 30¢ 45%

Tanged—

Tanged Firmers.....35 1-3¢ 10%
Buck Bros.....30%
Charles Buck Edge Tool Co.....30%
C. E. Jennings & Co. No. 101.....35%
L. & I. J. White Co.....25¢ 45%

Cold—

Cold Chisels, good quality.....15¢ 15¢
Cold Chisels, fair quality.....11¢ 12¢
Cold Chisels, ordinary.....9¢ 10¢

Chucks—

Almond Drill Chucks.....35%
Almond Turret Six-Tool Chuck.....35%
Beach Pat., each \$3.50.....35%
Empire.....25%
Blacksmiths.....25%
Jacobs' Drill Chucks.....35%
Pratt's Positive Drive.....25%
Skinner Patent Chucks:
Independent Lathe Chucks.....40¢ 10¢
Universal, Reversible Jaws.....40%
Combination, Reversible Jaws.....40%
Drill Chucks, New Model, 25%:
Standard, 40¢ 10%; Skinner Pat.,
25%; Positive Drive.....35%
Planer Chucks.....30%
Face Plate Jaws.....40¢ 10¢
Standard Tool Co.:
Improved Drill Chuck.....45%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6,
7, 8 and 17, 40%; No. 21.....35%
Scroll Combination, Nos. 82 and
94.....35%
General Scroll, Nos. 33, 34 and 35.....35%
Independent Iron, Nos. 18 and 318, 40%
Independent Steel, No. 64.....30%
Union Car Drill, Nos. 000, 101,
103.....35%
Universal 11, 12, 16, 17, 13, 14, 15, 40%
Universal, No. 42.....35%
Iron Face Plate Jaws, Nos. 29, 30,
48 and 50.....40%
Steel Face Plate Jaws, Nos. 70 and
72.....35%
Westcott Patent Chucks:
Lathe Chucks.....50%
Little Giant Auxiliary Drill.....50%
Little Giant Double Grip Drill.....50%
Little Giant Drill, Improved.....50%
Onida Drill.....50%
Scroll Combination Lathe.....50%

Clamps—

Adjustable, Hammers.....20¢ 20¢ 45%
Carriage Makers', P. B. & W.
Co.....40¢ 10¢ 50%
Bealy, Parallel.....35¢ 40%
Lineman's, Ulica Drop Forge & Tool
Co.....40%
Wood Workers, Hammers.....40¢ 10%
Saw Clamps, see Vises, Saw Filers.

Cleaners, Drain—

Iwan's Champion, Adjustable.....55%
Iwan's Champion, Stationary.....45%

Sidewalk—

Star Socket, All Steel.....\$4.05 net
Star Shank, All Steel.....\$3.24 net
W. & C. Shank, All Steel.....\$4.05 net
7 1/2 in., \$3.00; 8 in., \$3.25.

Cleavers, Butchers'—

Poster Bros.....30%
Fayette R. Plumb.....30%
L. & I. J. White Co.....30%

Clippers, Horse and Sheep—

Chicago Flexible Shaft Company:
No. 1 Chicago Horse, each.....\$8.75
No. 2 Chicago Horse, each.....\$10.75
20th Century Horse, each.....\$5.00
Lightning Belt Horse, each.....\$15.00
Chicago Belt Horse, each.....\$20.00
Stewart's Enclosed Gear
Horse, each.....\$10.75
Stewart's Patent Sheep Shear-
ing Machine, each.....\$12.75

Clips, Axle—

Regular Styles, list July 1, '05, 80%

Cloth and Netting, Wire—

—See Wire, &c.

Cocks, Brass—

Hardware list:
Plain Bibbs, Globe, Kerosene,
Racking, Liquor, Bottling,
&c.....70%
Compression Bibbs.....65¢ 10%

Coffee Mills—

See Mills, Coffee.

Collars, Dog—

Nickel Chain, Walter B. Stevens &
Son's list.....40%
Leather, Walter B. Stevens & Son's
list.....40%

Combs, Curry—

Metal Stamping Co.....40%

Compasses, Dividers, &c.

Ordinary Goods.....70¢ 10¢ 75%
Bemis & Call Hdw. & Tool Co.:
Dividers.....65%
Callipers, Double, 65%; Inside or
Outside.....65%
Callipers, Wm.....50%
Compasses.....50%
Wm. Schollhorn Co.:
Excelsior Dividers.....80%
Lodi Dividers.....75%

Conductor Pipe,—

L. C. L. to Dealers:

Territory: Galvanized
Galv. Charcoal Copper.
Steel. Iron. 1 1/2, 1 3/4, 2 1/2 oz.
Eastern:
60¢ 30% 60¢ 2 1/2% 40¢ 10%
Central:
70% 55¢ 7 1/2% 40¢ 7 1/2%
Western and Southern:
65¢ 10% 55¢ 2 1/2% 40¢ 5%
So. Western
62 1/2¢ 7 1/2% 50¢ 5% 40¢ 2 1/2%
Terms, 60 days; 2% cash 10 days. Fac-
tory shipments generally delivered.
See also Eave Troughs.

Coolers, Water—

Gal, each. 2 3 4 6 8
Labrador.....\$1.20 \$1.50 \$1.80 \$2.10 \$2.70
Gal.....\$1.50 \$2.10 \$2.40 \$3.00
Galvanized, ea. \$1.85 \$2.00 \$2.25 \$2.90 \$3.90
Galvanized, Lined, side handles,
Gal.....2 3 4 6 8
Each.....\$1.95 \$2.15 \$2.40 \$3.30 \$4.15
White Enamelled, 25%; Agate Lined, 25%

Coopers' Tools—

See Tools, Coopers'.

Coppers' Soldering—

Soldering Coppers, 3 lbs. to pair
and heavier, 25¢ 10¢ 2 1/2%
lighter than 3 lb. to pair.....25% 10¢ 2 1/2%

Cord— Sash—

Braided, Drab.....1b. 35¢
Braided, White, Com., Nos. 8
to 12, 2 1/2¢; No. 7, 2 1/4¢; No. 6,
2 1/2¢.

Cable Laid Italian—

lb., A, 18¢; B, 16¢
Common India.....1b. 10¢ 10¢ 4
Cotton Sash Cord, Twisted, 17¢ 15¢
Patent Russia.....1b. 10¢ 15¢
Cable Laid Russia.....1b. 10¢ 15¢
India Hemp, Braided, 1b. 10¢ 15¢
India Hemp, Twisted, 1b. 12¢ 15¢
Patent India, Twisted, 1b. 12¢ 15¢
Anniston Cordage Co.:
No. 8, solid.....\$0.24
No. 8, 3 to 12, \$0.24; No. 7,
\$0.24; No. 6, \$0.25; 3/4 doz., 50 ft.,
\$2.00; 50 ft., Columbus, \$0.85;
50 ft., Victoria, \$1.00; 50 ft., 4-Thread,
\$1.10; 60 ft., 3-Thread, \$0.95; 50 ft.,
Manila, \$1.40; 60 ft., Jute, \$0.75.
Pearl Braided, cotton, No. 6, 3/4 lb.,
25¢; No. 7, 25¢; Nos. 8 to 12, 24¢
Eddystone Braided, Nos. 8, 9 and
10, 25¢; 6, 25¢ 4¢.
Hemp Cable Laid Italian, Nos. 7
to 10.....\$0.23 4¢
Pullman:
Wire Sash Cord.....10%
Sash Cord Attachments, per doz. 10¢
Samson, Nos. 8 to 12:
Braided, per lb., Drab Cotton,
55¢; Italian Hemp, 40¢; Linen,
55¢; White Cotton or Spot.....35¢
Massachusetts, White.....\$0.30 4¢
Massachusetts, Drab.....\$0.35 4¢
Phoenix, White, Nos. 8 to 12, 27¢;
No. 7, 27¢; No. 6, 28¢ 4¢.
Silver Lake, per lb.:
A, Drab, 45¢; B, White, 40¢;
B, Drab, 40¢; H, White, 35¢
Italian Hemp, 40¢; Linen.....57¢ 4¢
See also Chain and Ribbon.

Wire, Picture—

List July 10, 1906.....85¢ 10¢ 10¢
Hendryx Standard Wire Picture Cord,
old list, 65¢ 10%

Cradles—

Grain.....10¢ 12 1/2%

Crayons—

White Round Crayons, Cases, 100
gro., \$6.50 to \$7.50 at factory, but
lower prices made by jobbers
Zelicker's Lumber.....gro.
Red and Purple, Indelible.....\$7.50
Blue, Red, Green, Yellow and
Terra Cotta.....\$6.50
Black.....\$4.00
See also Chalk.

Crooks, Shepherds'—

Fort Madison, per doz., Heavy, \$7.00;
Light.....\$6.50

Crow Bars—See Bars, Crow.

Cultivators—

Victor Garden.....50%

Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1817, 30 doz. \$3.50
Star Eagle, Rogers & Hamilton
and Anchor.....30 doz. \$3.00
Wm. Rogers & Son.....30 doz. \$2.50

Cutters— Glass—

H. H. Mayhew Co.....40%
Red Devil.....50%
Smith & Hemenway Co.....40%
Woodward.....40%

Meat and Food—

American.....30%
Nos. 1 2 3 4 5 6 7 8 9 10 11 12
Each.....\$5 \$7 \$10 \$25 \$50 \$60
Enterprise:
Nos. 5 10 12 22 32
Each.....\$2.50 \$2.75 \$4.50 \$6 25¢ 5¢ 7 1/2%
No. 22, \$1.50.....40¢ 7 1/2%
Dixon's.....1 2 3 4
Nos.....\$14.00 \$17.00 \$19.00 \$30.00
Ideal.....40¢ 10¢ 50%
Little Giant.....30 doz. 40¢ 50%
Nos.....\$30 \$10 \$12 \$20 \$22
N. E. Food Choppers.....25%
New Triumph No. 605, 30 doz. \$21.00.....40¢ 50%
Ruswin Food, No. 1, \$21.00; No. 2,
\$27.00.....45¢ 10¢ 10%
Woodruff.....30 doz. 40¢ 50%
Nos.....100 150
Enterprise Beef Shavers.....\$15.00 \$18.00

Slaw and Kraut—

Henry Disston & Sons:
Slaw and Kraut Cutters, Corn
Graters, &c.....35%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife.....30 doz. \$3.00
Combined Slaw Cutter and Corn
Grater.....30 doz. \$4.00
Traker & Dorsey Mfg. Co.:
Kraut Cutters.....40%
Slaw Cutters, 1 Knife.....30 gr. \$18¢ 45¢
Slaw Cutters, 2 Knife.....30 gr. \$22¢ 55¢

Tobacco—

All Iron, Cheap.....doz. \$4.25 to \$4.50
Enterprise.....2¢ 30%
National, 30 doz., No. 1, \$1; No. 2,
\$1.50.....10%

Diggers, Post Hole, &c.—

Delbey Post Hole Auger.....per doz., \$9.00
Disston's:
Rapid, 30 doz., \$24.00.....25%
Samson, 30 doz., \$34.00.....25%
Iwan's Improved Post Hole Auger.....10¢ 45¢
Vaughan Pattern Post Hole Augers:
Gal.....30 doz., \$8.25
Perfection Post Hole Diggers.....25%
Split Handle Post Hole Diggers.....25%
Kohler's, 30 doz., Universal, \$14.00;
Little Giant, \$12.00; Hercules,
\$10.00; Invincible, \$9.00; Rival,
\$8.00; Pioneer.....\$7.00
Never-Break Post Hole Diggers.....60%
doz., \$24.00.....60%

Dividers—See Compasses.

Drawers, Money—

Tucker's Pat. Alarm Till No. 1, 30
doz., \$18; No. 2, \$15; No. 3, \$12;
No. 4, \$10.

Drawing Knives—

See Knives, Drawing.

Dressers, Emery Wheel—

Diamond Emery Wheel Dressers.....35%
Diamond Wheel Dresser Cutters.....35%

Drills and Drill Stocks—

Common Blacksmiths' Drill,
each.....\$1.50 to \$1.75
Brest, Millers Falls.....15¢ 10¢
Brest, P. S. & W.....40%
Goodell Automatic Drills, 40¢ 50¢ 10¢ 10%
Johnson's Automatic Drills, Nos. 2
and 3.....16¢ 4¢
Johnson's Drill Points.....16¢ 4¢
Millers Falls Automatic Drills, 33¢ 10¢
Ratchet, Curtis & Curtis.....25%
Ratchet, Parker's, 40%; 40¢ 50¢ 10¢ 10%
Ratchet, Weston's, Style H in-
proved.....40%
Ratchet, No. 612.....40%
Ratchet, Whitney's, P. S. & W. 50%
Whitney's Hand Drill, No. 1, \$10.00;
Adjustable, No. 10, \$12.00.....33%

Twist Drills—

Bit Stock.....10¢ 10¢ 10¢ 70%
Taper and Straight Shank.....60¢ 10¢ 60¢ 10¢ 45%

Drivers, Screw—

Screw D'r Bits, per doz. 45¢ 50¢
Balsey's Screw Holder and Driver.....30%
doz., 2 1/2-in., 3-in., 4-in., \$7.50; 6-in.,
\$8.00.....50%
Buck Bros' Screw Driver Bits.....30%
Champion.....50%
Disston's.....70%
Edson.....40%
Fray's Hol. H'dle Sets, No. 3 \$12.50;
Ford's Brace Screw Drivers.....40¢ 10¢
Gay's Double Action Ratchet.....35%
Goodell's Auto. 50¢ 10¢ 10¢ 50¢ 10¢ 10¢ 45%
Hurdwood.....40%
Mayhew's Black Handle.....40%
Mayhew's Monarch.....40%
Millers Falls, Nos. 20 and 21.....25¢ 10¢
Millers Falls, Nos. 11, 12, 41, 42, 15¢ 10¢
New England Specialty Co.....50¢ 10¢
Smith & Hemenway Co.....40¢ 45%
H. D. Smith & Co.'s Perfect H'dle 40%
Stanley R. & L. Co.'s:
No. 64, Varn. Handles, 65%; No.
86, 75%; Victor, 55%; DeLancey, 70%
Swan's:
Nos. 7565 to 7568, 50%; No. 7540,
40¢ 10%

Eave Trough, Galvanized—

Territory: L. C. L. Galvanized
Galv. Charcoal Copper.
Steel. Iron. 1 1/2, 1 3/4, 2 1/2 oz.
Eastern:
80% 70¢ 5% 40¢ 10%
Central:
75¢ 10¢ 7 1/2% 70% 40¢ 7 1/2%
Western and Southern:
70¢ 20¢ 7 1/2% 60¢ 15¢ 2 1/2% 40¢ 45%
So. Western:
70¢ 20% 65¢ 2 1/2% 40¢ 2 1/2%
Terms—2% for cash. Factory ship-
ments generally delivered.
See also Conductor Pipe and Elbows.

Elbows and Shoes—

Factory shipments, all territories:
Galv. Steel and Galv. U. I.
Standard Gauge.....60¢ 10%
No. 20.....30%
No. 24.....35%
No. 22.....30%
Copper.....50%

Elbows, Stove Pipe—

Dover, one piece (R. M. Co.).....40¢ 10%
Perfect Elbows.....40%

Emery, Turkish—

4 to 54 to

16: 220: Flour.

1/4 Kegs.....1b. 5¢ 5¢ 4¢ 5¢ 4¢

1/4 Kegs.....1b. 5¢ 4¢ 5¢ 4¢ 5¢

10-lb. cans.....6¢ 4¢ 5¢ 4¢ 5¢

10 in case.....6¢ 4¢ 5¢ 4¢ 5¢

10-lb. cans, less

than 10.....10¢ 10¢

Extractors, Lemon Juice

—See Squeezers, Lemon.

Fasteners, Blind—Zimmerman's 50¢10%
Walting's 40¢10%**Cord and Weight—**

Ives 35¢10%

Faucets—Cork Lined 50¢10%
Metallic Key, Leather Lined 60¢10%Red Cedar 40¢10%
Petroleum 70¢10%B. & L. B. Co.:
Metal Key 60¢10%
Star 60¢10%West Lock 60¢10%
John Sommer's Peerless Tin Key 50¢10%John Sommer's Boss Tin Key 50¢10%
John Sommer's Victor Mtl. Key 50¢10%John Sommer's Duplex Metal Key 60¢10%
John Sommer's Diamond Lock 40¢10%John Sommer's I. K. L. Cork Lined 50¢10%
John Sommer's Reliable Cork Lined 50¢10%John Sommer's Chicago Cork Lined 50¢10%
John Sommer's O. K. Cork Lined 50¢10%John Sommer's No Brand, Cedar 30¢10%
John Sommer's Perfection, Cedar 40¢10%McKenna, Brass:
Burglar Proof, N. P. 25¢10%
Improved, 1/2 and 3/4 inch 25¢10%Self Measuring:
Enterprise, 1/2 doz. \$36.00 40¢10%
Lane's, 1/2 doz. \$36.00 40¢10%

National Measuring, 1/2 doz. \$36.00 40¢10%

Felloe Plates—

See Plates, Felloe.

Files— Domestic—

List revised Nov. 1, 1899.

Best Brands 70¢10%
Standard Brands 75¢10%
Lower Grade 75¢10%**Imported—**

Stubs' Tapers, Stubs' List, July 24, '97 33¢10%

Fixtures, Fire Door—Richards Mfg. Co.:
Universal, No. 103; Special, No. 104 30¢10%
Fusible Links, No. 56 30¢10%
Expansion Bolts, No. 107 30¢10%**Grindstone—**Net Prices:
Inch 15 17 19 21
Per doz. \$3.25 3.75 4.25 4.75P. S. & W. Co. 30¢10%
Reading Hardware Co. 30¢10%
Sowell's Giant Grindstone 30¢10%Stowell's Grindstone Fixtures, Extra Heavy, 50¢10%
Light 60¢10%**Fodder Squeezers—**

See Compressors.

Forks—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.

Iowa Dig-Easy Potato 60¢10%
Victor, Hay 60¢10%
Victor, Manure 60¢10%Victor, Header 60¢10%
Champion, Hay 60¢10%
Champion, Header 60¢10%Champion, Manure 60¢10%
Columbia, Hay 60¢10%
Columbia, Header 60¢10%Columbia, Manure 60¢10%
Columbia, Spading 60¢10%
Hawkeye Wood Barley 60¢10%W. & C. Potato Digger 60¢10%
Acme Hay 60¢10%
Acme Manure, 4 line 60¢10%Dakota Header 60¢10%
Jackson Steel Barley 60¢10%
Kansas Header 60¢10%W. & C. Lorraine Wood Barley 60¢10%
Plated.—See Spoons.**Frames— Saw—**White, 8'x1' Bar, per doz. 75¢10%
Red, 8'x1' Bar, per doz. 1.00¢10%
Red, 8'x1' Bar, per doz. 1.10¢10%**Freezers, Ice Cream—**Qt. 1 3 5 4 6
Each \$1.30 \$1.60 \$1.90 \$2.20 \$2.50**Fruit and Jelly Presses—**

See Presses, Fruit and Jelly.

Fry Pans—See Pans, Fry.**Fuse—**Per 1000 Feet.
Hemp 2.75
Cotton 3.20
Waterproof Sgl. Taped 3.65
Waterproof Dbl. Taped 4.40
Waterproof Tpl. Taped 5.15**Gates, Molasses and Oil—**

Stebbins' Pattern 80¢10%

Gauges—Marking, Mortise, etc. 50¢10%
Chapin-Stephens Co.:
Marking, Mortise, etc. 50¢10%
Scholl's Patent 50¢10%
Door Hangers 50¢10%Diston's Marking, Mortise, etc. 67¢10%
Stanley B. & L. Co.'s Butt and Rabbet Gauge 35¢10%
Marking and Mortise 60¢10%Wire, Brown & Sharpe's 25¢10%
Wire, Morse's 25¢10%
Wire, P. S. & W. Co. 35¢10%**Gimlets— Single Cut—**

Numbered assortments, per gro.

Nail, Metal, No. 1, \$2.00; 2, \$2.30
Spike, Metal, No. 1, \$1.00; 2, \$1.30
Nail, Wood Handled, No. 1, \$2.30; 2, \$2.60

Spike, Wood Handled, No. 1, \$1.30; 2, \$1.60

Glass, American Window

See Trade Report.

Glasses, Level—

Chapin-Stephens Co. 60¢10%

Glue, Liquid Fish—Bottles or Cans, with Brush 25¢10%
International Glue Co. (Martin's) 40¢10%**Grease, Axle—**Common Grade gro. \$1.50¢10%
Dixon's Everlasting, 10-lb. pails, ea. 85¢; in boxes, 1 doz. \$1.20;
2 lb. 25¢10%
Helmet Hard Oil 25¢10%**Griddles, Soapstone—**

Pike Mfg. Co. 35¢10%

Grindstones—Bicycle Emery Grinder \$6.50
Bicycle Grindstones, each \$2.00¢10%
Pike Mfg. Co.:
Improved Family Grindstones, per inch, 1/2 doz. \$2.00; 3/4 doz. \$2.50;
Pike Mower and Tool Grinder, each \$6.00**Grips, Nipple—**

Perfect Nipple Grips 40¢10%

Halters and Ties—Cow Ties 60¢10%
Covert Mfg. Co.:
Web 45¢10%
Jute Rope 45¢10%
Sisal Rope 35¢10%
Cotton Rope 45¢10%
Hemp Rope 45¢10%
Oneda Community 45¢10%Am. Coll. and Halters 40¢10%
Am. Cow Ties 45¢10%
Niagara Coll. and Halters 45¢10%
Niagara Cow Ties 45¢10%**Hammers—****Handled Hammers—**Heller's Machinists' 40¢10%
Heller's Farmers' 40¢10%
Magnetic Tack, No. 1, 2, 3, \$1.25;
\$1.50, \$1.75
Peck, Stow & Wilcox, Steel 50¢10%
Payette R. Plumb:
Plumb, A. E. Nail 35¢10%
Engineers' and H. S. Hand 50¢10%
Machinists' Hammers 50¢10%
Riveting and Tinner's 40¢10%**Heavy Hammers and Sledges—**Under 3 lb., per lb., 50¢ 80¢10%
3 to 5 lb., per lb., 50¢ 80¢10%
Over 5 lb., per lb., 30¢ 80¢10%
Wilkinson's Smiths' 10¢10%**Handles—****Agricultural Tool Handles**Axe, Pick, etc. 60¢10%
Hoe, Rake, etc. 45¢10%
Fork, Shovel, Spade, etc. 45¢10%
Long Handles 45¢10%
D Handles 50¢10%**Cross-Cut Saw Handles—**Atkins' 40¢10%
Champion 50¢10%
Diston's 50¢10%**Mechanics' Tool Handles—**Auger, assorted gro. \$2.50¢10%
Brad Axl. \$1.65¢10%
Chisel Handles, Ass'd, per gro.:
Tanged Firmer, Apple, \$2.40¢10%
\$2.65; Hickory \$2.15¢10%
Socket Firming, Apple, \$1.75¢10%
\$1.95; Hickory \$1.45¢10%
Socket Framing, Hickory, \$1.60¢10%
File, assorted gro. \$1.30¢10%
Hammer, Hatchet, etc. 60¢10%Hand Saw, Varnished, doz. 80¢10%
80¢10%: Not Varnished, doz. 85¢10%
Plane Handles:
Jack, doz. 3/4; Jack, Bolted, 75¢
Fore, doz. 4/4; Fore, Bolted, 90¢
Chapin-Stephens Co.:
Carving Tool 40¢10%
Chisel 50¢10%
File and Awl 50¢10%
Saw and Plane 40¢10%
Screw Driver 40¢10%
Mills Falls Adj. and Hatchet Auger Handles 15¢10%
Nicholson Simplicity File Handle 30¢10%**Hangers—**

NOTE.—Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, etc.

Allith Mfg. Co.:
Reliable, No. 1; Allith, No. 3; Allith Adjustable, No. 6; Reliable Parlor Door 50¢10%**Chicago Spring Butt Co.:—**Friction 25¢10%
Oscillating 25¢10%
Big Twin 25¢10%Chisholm & Moore Mfg. Co.:
Baggage Car Door 50¢10%
Elevator 50¢10%
Railroad 50¢10%Cronk & Carrier Mfg. Co.:
Loose Axle 60¢10%
Roller Bearing 70¢10%Griffin Mfg. Co.:
Solid Axle, No. 10, \$12.00 70¢10%
Roller Bearing, No. 11, \$15.00 70¢10%
Roller Bearing, Ex. Hy., No. 22, \$18.00 70¢10%Hinged Hangers, \$16.00 60¢10%
Lane Bros. Co.:
Parlor, Ball Bearing, \$4.00; Standard, \$3.15; No. 105, \$2.85; New Model, \$2.80; New Champion \$2.25
Barn Door, Standard 60¢10%
Covered 60¢10%
Special 70¢10%Lawrence Bros.:
Advance and Sterling 60¢10%
Cleveland and Peerless 75¢10%
Clipper, No. 75 60¢10%
Crown 60¢10%
Easy Parlor Door, Dbl. Sets, \$2.50; Single Sets, \$1.25 60¢10%Giant 60¢10%
Hummer 70¢10%
New York 60¢10%McKinney Mfg. Co.:
No. 1, Special, \$15 60¢10%
No. 2, Standard, \$18 60¢10%
Hinged Hangers, \$16 60¢10%
Meyers Stays 60¢10%Richards Mfg. Co.:
Hangers, Nos. 47, 48, 147, 247 60¢10%
Pioneer Wood Track No. 3, \$2.00
Ball B'r'g St'l Track No. 10, \$5.00
Roller B'r'g St'l Track No. 12, \$2.15
Roller B'r'g St'l Track No. 13, \$2.30
Roller B'r'g, Nos. 32, 41, 43 60¢10%Hero, Adj. Track No. 19 50¢10%
Adjustable Track Tandem Trolley Track No. 16 50¢10%
Seal, Steel Track No. 8 \$2.25
Auto Adj. Track No. 22 50¢10%
Trolley B. D. No. 17, \$1.25; F. D. No. 120, \$2.10; No. 121, \$2.25; No. 150, \$2.35
Safety Underwriters F. D. No. 101 50¢10%
Tandem No. 44, 24 and 3 60¢10%
Palace, Adjustable Track No. 132 50¢10%
Royal, Adjustable Track No. 133 50¢10%Ives' Wood Track No. 1 50¢10%
Trolley B. D. No. 29 50¢10%
Trolley B. D. No. 34, \$1.30; No. 37, \$1.40; No. 38, \$1.50
Roller Bearings, Nos. 37, 38, 39, 41, 43, 44, Sizes 1 and 2, 70¢10%
Anti-Friction, No. 43; No. 44, Sizes 24 and 3 50¢10%
Hinged Tandem No. 48 60¢10%
Folding Door B. B. Swivel No. 135 40¢10%Stowell Mfg. & Foundry Co.:
Acme Parlor Ball Bearing 40¢10%
Ajax Hinge Door 50¢10%
Ajax Parlor Door 50¢10%
Atlas, 60%; Freight Car Door, 60%
Baggage Car Door 50¢10%
Climax Anti-Friction 50¢10%
Elevator 40¢10%
Express 50¢10%
Interstate 60¢10%
Lundy Parlor Door 50¢10%
Magic, 60%; Rex Hinge Door, 60%
Matchless 60¢10%
Nansen 70¢10%
Parlor Door, 50¢10%; Railroad, 50¢10%Street Car Door 50¢10%
Steel, Nos. 300, 401, 501 50¢10%
Underwriters' Fire Door 50¢10%
Wild West Warehouse Door, 50%
Zenith for Wood Track 50¢10%A. L. Sweet Iron Works:
Check Back, 70%; Eagle 70%
Climax Anti-Friction 50¢10%
Hyo Hinge, New Perfection 60%
Pilot, Pilot Hinge 60%
Rider Wooster 60%
Western Pattern 70%Taylor & Boggs Fy Co.'s Kidder's Roller Bearing, 50¢15¢10%
Hangers—Garment—
Pullman Trouser, 1 pair Flat Aluminum, \$9.00; 1 pair Round Nickleled, \$9.00; 4 pair Round Nickleled, \$22.00; 1 pair Flat Gun Metal, \$12.00; 1 pair Flat Gun Enameled, \$7.50; 1 pair Wood Clamp, \$15.00; Skirt Hangers, Folding, per gro., \$21.00; Coat Hangers, Folding, per gro., \$20.00; Garment Hanger Rods, Round Nickleled, per gro., \$15.00; Garment Hanger Loops, Round Nickleled, per gro., \$15.00; Victor Folding, per gro. \$9.00
Western, W. G. Co. 70¢10%**Gate—**

Myers' Patent Gate Hangers, 1/2 doz. net \$4.50

Joist and Timber—

Lane Bros. Co. 30%

Hasps—Griffin's Security Hasp 50%
McKinney's Perfect Hasp, 1/2 doz. 50%**Hatchets—**Regular list, first quality 50%
Second quality \$1.00 per doz. less than first quality.**Heaters, Carriage—**

Clark, No. 3, \$1.75; No. 5B, \$2.00; No. 3, \$2.25; No. 1D, \$2.75; No. 1D, \$3.00; No. 5E, \$2.25; No. 1, \$3.50; No. 187, Clark Coal, 1/2 doz. \$0.75 10%

Hinges—**Blind and Shutter Hinges—**

Surface Gravity Locking Blind: (Victor; National; 1868 O. P.; Niagara; Clark's O. P.; Clark's Tip; Buffalo.)

No. 1 3 5
Doe, pair \$0.75 1.35 2.70**Mortise Shutter:—**(L. & P. O. S., Dixie, etc.)
No. 1 1 1/2 2 1/2
Doe, pair \$0.70 .65 .60 .55**Mortise Reversible Shutter (Buffalo, etc.):—**No. 1 1 1/2 2
Doe, pair \$0.70 .65 .60 .55North's Automatic Blind Fixtures, No. 2, for Wood, \$9.00; No. 3, for Brick, \$11.50 70¢10%
Charles Parker Co. 70¢10%
Parker Wire Goods Co.:
Hale & Benjamin Automatic Blind Hinges 20%
Hale's Blind Awning Hinges, No. 115, for wood, \$9.00; No. 111, for brick, \$9.00 20%
Reading's Gravity 60%
Stanley's Steel Gravity Blind Hinges, 1/2 doz. sets, without screws, \$9.00; with screws, \$1.20
Wrightville Hardware Co.:
O. S. Lull & Porter 75¢10%
Acme, Lull & Porter 75¢10%
Queen City Reversible 75¢10%
Shepard's Noiseless, Nos. 60, 65, 55 75¢10%
Niagara, Gravity Locking, No. 1, 3 & 5 75¢10%
1868, Old Pat'n, Nos. 1, 3 & 5 75¢10%
Tip Pat'n, Nos. 1, 3 & 5 75¢10%
Buffalo Gravity Locking, No. 1, 3 & 5 75¢10%
Shepard's Double Locking, Nos. 20 & 25 75¢10%
Champion Gravity Locking, No. 75, 75%
Steamboat Gravity Locking, No. 10, 75%
Pioneer, Nos. 000, 45 & 57 1/2 75%
Empire, Nos. 101 & 103 70%
W. H. Co.'s Mortise Gravity Locking, No. 2 60%**Gate Hinges—**Clark's or Shepard's—Doe, sets:
No. 1 3 5
Hinges with L't'chs. \$2.00 2.70 5.00
Hinges only 1.40 2.05 3.90
Latches only70 .70 .35**New England:—**With Latch doz. ... \$2.00
Without Latch doz. ... \$1.60**Reversible Self-Closing:—**With Latch doz. ... \$1.75
Without Latch doz. ... \$1.35**Western:—**With Latch doz. \$1.75
Without Latch doz. \$1.15Wrightville Hardware Co.:
Shepard's or Clark's, doe sets, No. 1, 2, 3
Hinges with Latches 1.00 2.70 5.00
Hinges only 1.40 2.05 3.90
Latches only70 .70 1.35**Pivot Hinges**Bommer Bros. Pivot 40%
Lawson Mfg. Co. Matchless 45%**Spring Hinges—**Holdback, Cast Iron \$6.50¢10%
Non-Holdback, Cast Iron \$6.25¢10%
J. Bardley:
Bardley's Non-Checking Mortise Floor Hinges 45%
Bardley's Patent Checking 15%
Bommer Bros.:
Bommer Ball Bearing Floor 40%
Bommer Spring Hinges 40%
No. 999 Wood, Steel Hold Back, 1/2 gr. \$9.00Chicago Spring Butt Co.:
Chicago Spring Hinges 25%
Triple End Spring Hinges 50%
Chicago (Ball Bearing) Floor 50%
Garden City Engine House 25%
Keene's Saloon Door 25%
Columbian Hardware Co.:
Acme, Wrought Steel 30%
Acme, Brass 25%
American 30%
Columbia, 1/2 gr., No. 14, \$9.00; No. 18, \$25.00
Columbia, Adj., No. 7, 1/2 gr. \$12.00
Gem, new list 30%
Clover Leaf 1/2 gr. \$12.00
Oxford, new list 30%
Floor Spring Hinges 65¢10%
Lawson Mfg. Co. Matchless 30%
Richards Mfg. Co.:
Superior Double Acting Floor Hinges 40%
Shelby Spring Hinge Co.:
Buckeye All Steel Holdback Screen Door 1/2 gr. \$9.00
Ball Bearing Floor Hinge 60%
Ohio Detachable Screen Door Hinge 1/2 gr. \$12.00
Superior Spring Hinge Co.:
Superior Floor Hinges 33%
The Stover Mfg. Co.:
Ideal, No. 10, Detachable, 1/2 gr. \$12.50
Ideal, No. 4 1/2 gr. \$9.00
New Idea, No. 1 1/2 gr. \$9.00
New Idea, Double Acting 45%
New Idea, Floor 45%
Van Wagner:
Ball Bearing 25%
No. 177 Sh't Steel Hold'b'k. 1/2 gr. pr. \$9.00**Wrought Iron Hinges—**Strap and T Hinges, etc., list December 20, 1904:
Light Strap Hinges 65%
Heavy Strap Hinges 75%
Light T Hinges 60%
Heavy T Hinges 55%
Extra Heavy T Hinges 70%
Hinge Hasps 45%
Cor. Heavy Strap 75%
Cor. Ex. Heavy T 70¢10%

Extra 10% often given on most of these Hinges.

Screw Hook { 6 to 12 in. 1b. 3¢
14 to 20 in. 1b. 3¢
22 to 36 in. 1b. 3¢

Screw Hook and Eye:
3/4 to 1 inch 1b. 6¢
1 1/2 inch 1b. 7¢
2 inch 1b. 8¢

Hitchers, Stall—
Covert Mfg. Co., Stall Hitchers. 30¢2¢
Hods—Coal—

Inch 15 15 17 18
Galv. Open. \$2.50 2.75 3.00 3.25
Jap. Open. \$1.90 2.10 2.25 2.55
Galv. Funnel. \$3.00 3.30 3.60 3.90
Jap. Funnel. \$2.45 2.65 2.85 3.30

Masons' Etc.—
Cleveland Wire Spring Co.:
Steel Brick, No. 182, each \$0.95
Steel Mortar, No. 158, each \$1.25

Hoes—Eye—
Scovill and Oval Pattern. 60¢10¢60¢10¢10¢

Grub, list Feb. 23, 1899. 70¢10¢75¢10¢
D. & H. Scovill. 30¢

Handled—
NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.

Cronk's Weeding No. 1, \$2.00; No. 2, \$2.25
Ft. Madison Cotton Hoe. 70¢10¢10¢
Ft. Madison Crescent Cultivator Hoe. 70¢10¢
Ft. Madison Mattock Hoe. 70¢10¢
Regular Weight. 70¢10¢
Junior Size. 70¢10¢
Ft. Madison Sprouting Hoe. 70¢10¢
Ft. Madison Dixie Tobacco Hoe. 75¢10¢75¢

Kretzinger's Cut Easy. 70¢10¢
Warren Hoe. 45¢10¢
W. & C. Ivanhoe. 75¢12¢
B. B. 6 in. Cultivator Hoe. 75¢12¢
B. B. 8 in. 75¢12¢
Acme Weeding. 70¢10¢
W. & C. L'ning Shuffle Hoe. 70¢10¢

Hoisting Apparatus—
See Machines, Hoisting.
Holders—Bit—

Angular. 70¢10¢
Bardley's. 45¢
Empire. 50¢
Pullman. 50¢
Superior. 33¢

File and Tool—
Nicholson File Holders and File Handles. 33¢40¢
Triumph Fruit Jar Holder. 70¢10¢
Hones—Razor—

Pike Mfg. Co., Belgian, German and Swat. 70¢10¢
Hooks—Cast Iron—

Bird Cage, Reading. 40¢
Clothes Line, Reading List. 40¢
Clothes Line, Stowell's. 40¢
Coat and Hat, Reading. 45¢20¢
Coat and Hat, Stowell's. 70¢
Coat and Hat, Wrightsville. 50¢
Harness, Reading List. 40¢
Harness, Stowell's. 40¢
School House, Stowell's. 70¢

Wire—
Belt. 90¢10¢
Wire C. & H. Hooks. 75¢10¢75¢10¢10¢
Columbian Hdw Co., Gem. 70¢10¢
Parker Wire Goods Co., King. 70¢10¢
Van Wagner, Coat and Hat. 70¢
Western W. G. Co. Molding. 75¢
Wire Goods Co.: Chief, 70¢; Crown, 75¢; Car, 65¢; V. Brace, 75¢; Car Harness, 50¢10¢.

Wrought Iron—
Box, 6 in., per doz. \$1.00; 8 in., \$1.25; 10 in., \$1.50.
Cotton. 10¢10¢
Wrought Staples, Hooks, &c.—
See Wrought Goods

Miscellaneous—
Hooks, Bench, see Staps, Bench.
Bush, Light, doz. \$1.75; Medium, \$5.35; Heavy, \$6.55
Grass, best, all sizes, per doz. \$1.60
Grass, common grades, all sizes, per doz. \$1.30
Whiffletree. 1b. 5¢
Hooks and Eyes:
Brass. 60¢5¢60¢10¢5¢
Malleable Iron. 70¢70¢10¢
Covert Mfg. Co. Gate and Scuttle Hooks. 40¢
Ft. Madison Cut-Easy Corn Hooks. 40¢
Bench Hooks—See Bench Staps.
Corn Hooks—See Knives, Corn.

Horse Nails—
See Nails, Horse.
Horsehoes—
See Shoes, Horse.
Hose, Rubber—
Garden Hose, 3/4-inch:
Competition. ft. 5 @ 6¢
3-ply Guaranteed. ft. 8 @ 9¢
4-ply Guaranteed. ft. 10 @ 11¢
Cotton Garden, 3/4-in., coupled:
Low Grade. ft. 8 @ 9¢
Fair Quality. ft. 10 @ 11¢

Irons—Sad—
From 4 to 10. 1b. 3¢
R. B. Sad Irons. 1b. 3¢
Mrs. Potts', cents per set:
Nos. 50 55 60 65
Jap'd Tops. 65 62 75 72
Tin'd Tops. 70 67 80 77
New England Pressing. 1b. 3¢

Pinking—
Pinking Irons. doz. 40¢

Irons, Soldering
See Copiers.
Jacks, Wagon—
Covert Mfg. Co.:
Auto Screw. 30¢2¢; Steel, 45¢
Lockport. 50¢
Lane's Steel. 30¢10¢2¢
Richards' Tiger Steel, No. 130. 50¢10¢
Smith & Hemenway Co.'s. 25¢

Kettles—
Brass, Spun, Plain. 20¢25¢
Enameled and Cast Iron—See Ware, Hollow.

Knives—
Butcher, Kitchen, &c.—
Foster Bros' Butcher. 30¢
Wilkinson Shear & Cutlery Co. 60¢

Corn—
Wilkinson Wilcut Brand Knives and Hooks. 60¢
Withington Acme. 70¢10¢
Dent. \$2.75; Adl. Serrated, \$2.20;
Serrated, \$2.10; Yankee No. 1, \$1.50;
Yankee No. 2, \$1.15.

Drawing—
Standard List. 75¢45¢75¢10¢
C. E. Jennings & Co., Nos. 45, 46, 60.
Jennings & Griffin, Nos. 41, 42. 60¢
Swan's. 70¢10¢
Watrous. 16¢
L. & J. J. White. 20¢25¢

Hay and Straw—
Serrated Edge per doz. \$5.75 to \$6.00
Iwan's Sickle Edge. 70¢10¢
Iwan's Serrated. 70¢10¢

Mining—
Buffalo. 70¢10¢

Miscellaneous—
Farriers'. doz. \$3.00 to \$3.25
Westenholm's. doz. \$3.00 to \$3.25

Knobs—
Base, 2 1/2-inch, Birch, or Maple, Rubber Tip. 70¢10¢
Carriage, Jap., all sizes. 40¢45¢
Door, Mineral. 65¢70¢
Door, Por. Jap'd. 70¢75¢
Door, Por. Nickel. 70¢75¢
Bardley's Wood Door, Shutters, &c. 15¢

Lacing, Leather—
See Belting, Leather.
Ladders, Store, &c.—
Allith Mfg. Co., Reliable. 50¢
Lane's Store. 25¢
Myers' Noiseless Store Ladders. 50¢
Richards Mfg. Co.:
Improved Noiseless, No. 112. 50¢
Climax Shelf, No. 113. 50¢
Trolley, No. 100. 50¢

Ladies, Melting—
L. & G. Mfg. Co. (low list). 25¢
P. S. & W. 50¢
Reading. 50¢

Lanterns—Tubular—
Regular Tubular, No. 0. 40¢45¢
Lift Tubular, No. 0. 40¢45¢
Hinge Tubular, No. 0. 40¢45¢
Other Styles. 40¢45¢

Bull's Eye Police—
No. 1, 2 1/2-inch. \$2.75 to \$3.00
No. 2, 3-inch. \$3.00 to \$3.25

Lasts and Stands, Shoe—
Stowell's Atlas, Malleable Iron. 50¢
Stowell's Badger, Cast Iron. 50¢

Latches—Thumb—
Roggin's Latches, with screw. 40¢35¢40¢

Door—
Allith Mfg. Co., Automatic, No. 400. 40¢
Crank & Carrier Mfg. Co., No. 101. 40¢
Crank & Carrier Mfg. Co., Latch. 40¢
Hasp and Staples. 50¢
Richards' Bull Dog, Heavy. 50¢
Richards' Trump, No. 127. 50¢
Stowell's Steel. 50¢

Leaders, Cattle—
Small. 80¢; large, 80¢
Covert Mfg. Co.:
Cotton, Hemp and Jute, 45¢;
Sisal, 33¢.

Lifters, Transom—
R. & E. 33¢

Lines—
Wire Clothes, Nos. 18 19 20
100 feet. \$2.25 2.00 1.75
75 feet. \$1.75 1.35 1.10
Annapolis Waterproof Clothes. 50¢
70¢
\$2.00; Gilt Edge. \$2.00; Air Line. \$2.00; Acme. \$18.00; Alabama. \$17.00; Empire. \$16.00; Advance. \$14.00; Eclipse. \$13.50; Chicago. \$11.50; Standard. \$10.50; Columbia. \$9.50; Allison. \$13.50; Calhoun. \$12.00.
Samson Cordage Works:
Solid Braided Chalk. Nos. 0 to 3. 40¢
Silver Lake Braided Chalk. No. 0. \$6.00; No. 1. \$4.50; No. 2. \$7.00; No. 3. \$7.50.
Masons' Lines, Shade Cord, &c.:
White Cotton. No. 3/4. \$1.50; No. 4. \$2.00; No. 4 1/2. \$2.50; Colors. No. 3/4. \$1.75; No. 4. \$2.25; No. 4 1/2. \$2.75; Lines. No. 3/4. \$2.50; No. 4. \$3.50; No. 4 1/2. \$4.50.
Tent and Awning Lines: No. 5. White Cotton. \$7.50; Drab Cotton. \$8.50.
Clothes Lines. White Cotton. 20 ft. \$2.75; 30 ft. \$3.25; 40 ft. \$3.75; 50 ft. \$4.00; 60 ft. \$4.25; 70 ft. \$4.75; 100 ft. \$5.25.

Locks—Cabinet—
Cabinet Locks. 33 1/2¢ to 33 1/2¢47 1/2¢
Door Locks, Latches, &c.—
NOTE.—Net Prices are very often made on these goods.
Reading Hardware Co. 40¢
K. & E. Mfg. Co. 40¢

Elevator—
Stowell's. 50¢

Padlocks—
Wrought Iron. 75¢10¢45¢80¢45¢
Net prices are general.
K. & E. Mfg. Co. Wrought Steel and Brass. 75¢10¢

Sash, &c.—
Ives' Patent:
Bronze and Brass, 60¢; Crescent, 40¢20¢; Iron, 60¢; Window Ventilating, 55¢; Robinson Pat. Ventilating Sash Lock, 35¢1; Wrought Bronze and Brass, 55¢; Wrought Steel, 55¢.
Pullman Patent Ventilating Lock. 35¢
Reading. 40¢

Machines—Boring—
Com. Up'r, without Augers. \$2.00 to \$2.25
Com. Ang'r, without Augers. \$2.25 to \$2.50
Swan's Improved. 40¢10¢
Jennings'. Nos. 1 and 4. 35¢5¢
Millers' Falls. 5.75
Snell's, Rice's Pat. 2.50 2.75

Corking—
Reisinger Invincible Hand Power. 40¢
Williams' Fence Machines. each, \$5.50

Fence—
Hoisting—
Moore's Anti-Friction Differential Pulley Block. 30¢
Moore's Hand Hoist, with Lock Brake. 30¢

Ice Cutting—
Chandler's. 12 1/2¢

Washing—
Boss Washing Machine Co.: Per doz.
Boss No. 1. \$57.00
Boss Rotary. \$54.00
Champion Rotary Banner No. 1. \$54.00
Standard Champion No. 1. \$48.00
Standard Perfection. \$35.00
Cint'l Square Western. \$30.00
Uneda American, Round. \$30.00

Mallets—
Hickory. 45¢50¢
Lignumvita. 45¢50¢
Tinners' Hickory and Applewood. 45¢50¢

Mangers, Stable—
Sweet Iron Works. 50¢

Mashers, Vegetable—
Western W. G. Co. Potato. 60¢10¢

Mats, Door—
Elastic Steel (W. G. Co.), new list. 50¢10¢
Keystone Wire Matting Co.:
Keystone. 50¢
Ideal. 50¢

Mattocks—
See Picks and Mattocks.
Milk Cans—See Cans, Milk.
Mills, Coffee, &c.—
Enterprise Mfg. Co. 20¢25¢
National list Jan. 1, 1902. 30¢
Parker's Columbia & Victoria. 50¢10¢60¢
Parker's Box and Side. 50¢10¢60¢
Swift Lane Bros. 30¢

Mowers, Lawn—
NOTE.—Net prices are generally quoted
Cheapest. all sizes, \$1.85 to \$2.00
Cheap. all sizes, \$2.00 to \$2.50
Better grade. all sizes, \$2.50 to \$5.00
High Grade. \$4.50 4.75 5.00 5.25
Continental. 60¢45¢
Great American. 70¢
Great American Ball B'r, new list. 70¢
Quaker City. 70¢
Pennsylvania. 60¢5¢
Pennsylvania, Jr. Ball Bearing. 50¢
Pennsylvania Golf. 50¢
Pennsylvania Horse. 33 1/2¢45¢
Pennsylvania Pony. 40¢45¢
Granite State:
Style A, Low Wheel. 70¢10¢10¢45¢
Style B, Low Wheel. 70¢10¢45¢
Style C, High Wheel. 70¢10¢
Style D, High Wheel. 70¢
Philadelphia:
Styles M. S. C. K. T. 70¢45¢
Style A, all Steel. 60¢45¢
Style E, High Wheel. 70¢10¢45¢
Drexel and Gold Coin, special list. 50¢

Nails—
Wire Nails and Brads. Miscellaneous. 85¢10¢85¢10¢45¢
Cut and Wire. See Trade Report.
Hungarian, Finishing, Upholsterers' &c. See Tacks.
Horse—
Nos. 1 7 8 9 10
Anchor. 23 21 20 19 18. 40¢45¢
Chaplman. 28 26 25 24 23. 50¢
Coleman. 13 12 11 10. net
New Haven. 23 21 20 19 18. 40¢45¢
Western. 40¢
Jobbers' Special Brands. per lb. 9¢10¢
Picture—
1 1/2 2 2 1/2 3 in.
Brass H'd. 55 60 70. gro
Por. Head. 1.10 1.10 1.10. gro
Nippers—
See Pliers and Nippers.
Nuts—
Cold Punched. Off list.
Square, Blank or Tapped. 5.80 to 5.90¢
Hexagon, Blank or Tapped. 5.20 to 5.30¢

Square, Blank, C. & T. 5.10 to 5.2¢
Hexagon, Blank, C. & T. 5.80 to 5.90¢

Hot Pressed:
Square, Blank. 5.00 to 5.10¢
Hexagon, Blank. 5.40 to 5.50¢
Square, Tapped. 4.90 to 5.00¢
Hexagon, Tapped. 5.30 to 5.40¢

Oakum—
Rest. 1b. 6 1/2¢
U. S. Navy. 1b. 6¢
Navy. 1b. 5¢
Plumbers' Spun Oakum. 1b. 5¢
In carload lots 1/4 lb. off, f.o.b. New York.

Oil Tanks—See Tanks, Oil.
Oilers—
Brass and Copper. 50¢10¢
Tin or Steel. 65¢10¢45¢70¢
Zinc. 65¢10¢45¢70¢
Chase or Paragon:
Brass and Copper. 50¢10¢
Tin or Steel. 65¢10¢
Zinc. 65¢10¢
Malleable, Hammers' Imp'd. Nos. 11, 12 and 13. 20¢; Old Pattern, Nos. 1, 2, 3. 50¢.

American Tube & Stamping Co.:
Spring Bottom Cans. 70¢10¢10¢
Railroad Oilers, &c. 40¢60¢10¢

Openers—Can—Per doz.
Sprague, Iron Handle. 30¢35¢
Sprague, Wood Handle. 35¢40¢
Sardine Scissors. \$1.75 to \$3.00
National. 50¢10¢
Stowell's Sprague. 70¢35¢45¢
Vim Tin Shear and Can Opener. 70¢10¢, 15¢; per gro., \$7.50

Egg—
Nickel Plate. 70¢10¢, \$2.00; Silver Plate, \$4.00.

Packing—
Asbestos Packing, Wick and Rope. 17¢22¢

Rubber—
(Fair quality goods.)
Sheet, C. 1. 11¢12¢
Sheet, C. O. 8. 11¢12¢
Sheet, C. B. 8. 12¢13¢
Sheet, Pure Gum. 10¢45¢
Sheet, Red. 10¢50¢
Jenkins' 9¢, 10¢ 80¢ 25¢45¢

Miscellaneous—
American Packing. 1b. 7¢10¢
Cotton Packing. 1b. 16¢25¢
Italian Packing. 1b. 9¢12¢4¢
Jute. 4¢14¢
Russia Packing. 1b. 8¢11¢

Pails, Creamery—
R. M. Co., with gauges—No. 1, \$6.25; No. 2, \$6.50 per doz.

Pails, Water, Well, &c.—
See Buckets.

Pans—Dripping—
Standard List. 65¢10¢

Fry—
Common Lipped:
Nos. 1 2 3 4 5
Per doz. \$0.75 0.80 0.90 1.10 1.30
Refrigerator, Galva. 12 14 16 18
Per doz. \$1.75 2.25 2.80 3.15

Roasting and Baking—
Regal, R. M. Co., per doz. Nos. 3, \$4.50; 10, \$5.25; 20, \$5.75; 30, \$6.25; Savory, 40¢ doz, net, Nos. 200, \$9.00; 400, \$15.00.
Simplex, per gro.:
No. 49 50 60 100 150 160
\$30.00 35.00 42.00 34.00 39.00 46.00

Paper—Building Paper
Asbestos: 1b.
Roll Board or Building Felt, 6 to 30 lb., per 100 sq. ft. 6¢
Roll Board or Building Felt, 3-32 and 1/4 in., 45 to 60 lbs., per 100 sq. ft. 8¢
Mill Board, Sheet, 40 x 40 in., 1-32 to 1/2 in. 7¢
Per roll
Rosin Sized Sheathing: 500 sq. ft. Light weight, 25 lbs. to roll. 35¢40¢
Medium weight, 30 lbs. to roll. 40¢45¢
Heavy weight, 40 lbs. to roll. 50¢60¢

Black Water Proof Sheathing, 500 sq. ft., 1 ply, 65¢; 2 ply, 85¢; 3 ply, \$1.10; 4 ply, \$1.25.
Deafening Felt, 9, 6 and 1/2 sq. ft. to lb. ton. \$19.00
Red Rope Roofing, 250 sq. ft. per roll. \$1.75

Tarred Paper—
1 ply (roll 300 sq. ft.), ton. \$32.50 to \$35.50
2 ply, roll 108 sq. ft. 55¢
3 ply, roll 108 sq. ft. 75¢
Slater's Felt (roll 500 sq. ft.) 70¢

Sand and Emery—
Flint Paper and Cloth. 50¢10¢60¢
Garnet Paper and Cloth. 95¢
Emery Paper and Cloth. 50¢10¢60¢

Parers—Apple—
Advance. 70¢10¢
Baldwin. 70¢10¢
Bonanza Improved. each \$0.50
Daisy. 70¢10¢
Dandy. 70¢10¢
Eureka Improved. each \$20.00
Family Ray State. 70¢10¢
Improved Ray State. 70¢10¢
Little Star. 70¢10¢
New Light. 70¢10¢
Reading 72. 70¢10¢

Reading 75.....	per doz.	\$6.25
Rocking Table.....	per doz.	\$4.20
Turn Table.....	per doz.	\$4.00
White Mountain.....	per doz.	\$5.00

Potato—

Saratoga.....	per doz.	\$7.00
White Mountain.....	per doz.	\$6.00

Picks and Mattocks—

List, Feb. 23, 1899.....	75¢/75¢	5%
Cronk's Handled Garden.....	75¢	5%
per doz., \$6.00.....	33%	

Pinking Irons—

See Irons, Pinking.

Pins, Escutcheon—

Brass.....	50¢/10¢/60¢	
Iron, list Nov. 11, '85.....	60¢/60¢/10¢	

Pipe, Cast Iron Soil—

Standard, 2-6 in. 50¢/10¢/50¢/10¢/5%		
Extra Heavy, 2-6 in. 50¢/10¢/5%		
Fittings.....	70¢/10¢/70¢/10¢/5%	

Pipe, Merchant—

Consumers, Carloads.					
		Steel.		Iron.	
		Blk. Galv.		Blk. Galv.	
1/4 & 3/4 in.	71%	55%	68%	52%	6%
1/2 in.	73%	59%	70%	56%	6%
3/4 in.	75%	63%	72%	60%	6%
1 in.	77%	69%	76 1/2%	66 1/2%	6%
1 1/4 in.	79%	69%	71 1/2%	56%	6%
1 1/2 in.	74%	59%			

Rules

Boxwood	.....60@60&10%
Ivory	.....35&10@35&10&45%
Chapin-Stephens Co.:	
Boxwood	.....60%
Flexfold	.....27&10&10%
Ivory	.....35&10&10%
Miscellaneous	.....50&50&10&10%
Stephens' Combination	.....50&50&10%
Stationers'	.....10&10&10%
Keuffel & Esser Co.:	
Folding, Wood	.....35&10%
Folding, Steel	.....33&10%
Lufkin's Steel	.....50&10%
Lufkin's Lumber	.....60%
Stanley R. & L. Co.:	
Boxwood	.....37&10%
Ivory	.....45%
Miscellaneous	.....60%
Zig Zag	.....40%
Zig Zag, Pin Joint	.....45%
Union Nut Co.:	
Boxwood	.....60&60&10%
Ivory	.....35&10@35&10&10%

Sash Balances—

See Balance, Sash.

Sash Locks—

See Locks, Sash.

Sash Weights—

See Weights, Sash.

Sausage Stuffers or Fillers

See Stuffers or Fillers, Sausage.

Saw Frames—

See Frames, Saw.

Saw Sets—See Sets, Saw.**Saw Tools—See Tools, Saw.****Saws—**

Atkins':	
Circular	.....50%
Band	.....60&10@60%
Cross Cuts	.....35&5%
Mulay, Mill and Drag	.....50%
One-Man Saw, 40%: Wood Saws,	.....40%: Hand, Compass, &c., 40%:
Chapin-Stephens Co.:	
Turning Saws and Frames	.....30&30&10%
Diamond Saw & Stamping Works	.....30&10&10%
Sterling Kitchen Saws	.....30&10&10%
Diston's:	
Circular, Solid and Ins'ted Tooth	.....50%
Band, 2 to 14 in. wide	.....50%
Band, 1/4 to 1 1/2 in.	.....60%
Crosscuts	.....45%
Narrow Crosscuts	.....50%
Mulay, Mill and Drag	.....50%
Framed Wood Saws	.....50%
Wood Saw Blades	.....25%
Wood Saw Rods	.....25%
Hand Saws, Nos. 12, 99, 9, 16, 4100	.....25%
Do, 120, 76, 77, 8	.....25%
Hand Saws, Nos. 7, 107, 107 1/2, 3, 1	.....25%
0, 60, Combination	.....25%
Compass, Key Hole, &c.	.....25%
Butcher Saws and Blades	.....30%
C. E. Jennings & Co.:	
Back Saws	.....25%
Butcher Saws	.....30%
Compass and Key Hole Saws	.....30%
Framed Wood Saws	.....30%
Hand Saws	.....25&25%
Wood Saw Blades	.....30%
Millers Falls:	
Butcher Saws	.....15&10%
Star Saw Blades	.....15&10%
Peace & Richardson's Hand Saws	.....30%
Simonds':	
Circular Saws	.....25%
Crescent Ground Cross Cut Saws	.....35%
One-Man Cross Cuts	.....40&10%
Gang Mill, Mulay and Drag Saws	.....50%
Hand Saws	.....25&25%
Back Saws	.....25&25%
Butcher Saws	.....30&30&10%
Hand Saws	.....25&25%
Hand Saws, Bay State Brand	.....40%
Compass, Key Hole, &c.	.....25%
Wood Saws	.....25&25%
Springfield Mach. Screw Co.:	
Diamond Kitchen Saws	.....40&10@50%
Butcher Saws and Blades	.....35&40%
Wheeler, Madden & Clemens	.....50%
Co.'s Cross Cut Saws	.....50%

Hack Saw Blades and Frames—

Atkins' Hack Saw Blades A & A	.....25%
Diston's:	
Concave Blades	.....25%
Keystone Blades	.....25%
Hack Saw Frames	.....25%
Fitchburg File Works, The Best	.....30%
C. E. Jennings & Co.:	
Hack Saw Frames, Nos. 175, 180	.....40&7&10%
Hack Saws, Nos. 175, 180, complete	.....40&7&10%
Goodell's Hack Saw Blades	.....40%
Griffin's Hack Saw Frames	.....35&5&10%
Griffin's Hack Saw Blades	.....35&5&10%
Springfield Mach. Screw Co.:	
Diamond Hack Saw Blades	.....35%
Diamond Hack Saw Frames	.....50%
Star Hack Saws and Blades	.....15&10%
Sterling Hack Saw Blades	.....30&10&5%
Sterling Power Hack Saw Machines	.....25%
each, No. 1, \$25.00; No. 2, \$30.00	.....10%
Victor Hack Saw Blades	.....25%
Victor Hack Saw Frames	.....40%

Scrolls—

Barnes, No. 7, \$15	.....25%
Barnes' Scroll Saw Blades	.....40%
Barnes' Velociped Power Scroll Saw	.....50%
without boring attachment, \$18	.....50%
with boring attachment, \$20	.....50%
Lester, complete, \$10.00	.....15&10%
Rogers, complete, \$4.00	.....15&10%

Scales—

Family, Turnbull's	.....50@50&10%
Counter:	
Hatch, Platform, 1/4 oz. to 1 lb.	.....\$5.50
Two Platforms, 1/4 oz. to 5 lbs.	.....\$10.00
Union Platform, Plain, \$1.70	.....\$1.70
Union Platform, Std., \$1.85	.....\$1.85
Chattillon's:	
Favorite	.....25%
Crocker's Trip Scales	.....25%
Chicago Scale Co.:	
The "Little Detective"	.....25%
Union or Family No. 1	.....25%

Portable Platform (reduced list)	.....50%
Wagon or Stock (reduced list)	.....25&35%
"The Standard" Portables	.....50%
"The Standard" R. R. and Wagon	.....50%

Scrapers—

Box, 1 Handle	.....dos. \$2.00@2.25
Box, 2 Handle	.....dos. \$3.50@2.60
Ship	.....Light, \$2.00; Heavy, \$4.50
Adjustable Box Scraper (S. R. & L. Co.)	.....\$4.00
Chapin-Stephens Co., Box	.....30@30&10&10%

Screens, Window and Frames—

Maine Screen Frames	.....40&10&5%
See also Doors.	

Screws—Bench and Hand

Bench, Iron, doz., 1 in.	.....\$2.50
2 1/2; 1 1/2, \$3.00@3.25; 1 1/4, \$3.50@3.75	
Bench Wood	.....25@25&5%
Hand, Wood	.....35@25&5%
R. Bliss Mfg. Co., Hand	.....30&30&10%
Chapin-Stephens Co., Hand	.....25%
Coach, Lag and Hand Rail	
Lag, Cone Point, list Oct. 1	.....99
Coach, Gimlet Point, list Oct. 1, '99	.....75&15%
Hand Rail, list Jan. 1, '81	.....70&10@75%

Jack Screws—

Standard List	.....75&10@80%
Millers Falls	.....50&10&10%
Millers Falls, Roller	.....50&10%
P. S. & W.	.....50%
Swett Iron Works	.....75&80%

Machine—

List Jan. 1, '98:

Flat or Round Head, Iron

50@50&10%

Flat or Round Head, Brass

50@50&10%

Set and Cap—

Set (Iron)80@80&45%
Set (Steel), net advance over Iron	.....25%
Sq. Hd. Cap	.....75%
Hex. Hd. Cap	.....75%
Rd. Hd. Cap	.....60&10%
Fullister Hd. Cap	.....60&10&10%

Wood—

List July 23, 1903:

Flat Head, Iron

87&10@10%

Round Head, Iron

85&10@10%

Flat Head, Brass

62&10@10%

Round Head, Brass

80&10@10%

Flat Head, Bronze

77&10@10%

Round Head, Bronze

75&10@10%

Drive Screws

87&10@10%

Scroll Saws—

See Saws, Scroll.

Scythes—

Per doz.

Grass, No. 1, Plain

\$4.25@6.75

Clipper, Bronzed Webb

\$4.50@7.00

No. 3 Clipper, Pol'd Webb

\$6.75@7.25

No. 6 Clipper and Solid Steel

\$7.00@7.50

Bush, Weed and Bramble, No. 2

\$8.50@7.00

Grain, No. 1

\$8.25@8.75

Bronzed Webb, No. 1

\$8.50@9.00

Nos. 3 and 4 Clipper, Grain

\$8.75@9.25

Solid Steel, No. 6

\$9.25@9.75

Seeders, Raisin—

Enterprise

25&30%

Sets—Awl and Tool—

Fray's Adj. Tool Handles, No. 1, \$12;

2, \$15; 3, \$12; 4, \$9; 5, \$7

C. E. Jennings & Co.'s Model Tool

Holders

Millers Falls Adj. Tool Handles, No. 1, \$12; No. 2, \$12; No. 3, \$15

15&10%

Garden Tool Sets—

Ft. Madison Three Plows, Hoe, Rake

and Shovel

\$9 doz sets \$9.00

Sets, Nail—

Octagon

gro. \$3.50@3.75

Buck Bros

27&10%

Cannon's Diamond Point, \$9 doz

\$12.40

Mayhew's

gro. \$9.00

Snell's Corrugated, Cup Pt.

gro. \$7.20

Snell's Knurled, Cup Pt.

gro. \$7.20

Springfield Mach. Screw Co.

gro. \$7.50

Diamond Knurled Cup Pt.

gro. \$7.50

Rivet—

Regular list

75@75&10%

Saw—

Atkins':

Criterion

40%

Adjustable

40%

Bemis & Call Co.:

Cross Cut

30%

Plate

25%

Diston's Star, Monarch and Tri-

umph

30%

Morrell's No. 1, \$15.00

50%

Nos. 3 and 4, Cross Cut, \$20.00

50%

No. 6, Mill, \$30.00

50%

No. 12, 11, 25, \$15.00

50%

No. 1 Old Style, \$10.00

50%

Special, \$15.25

50%

Giant Royal Cross Cut

\$9 doz. \$8.00

Royal, Hand

\$9 doz. \$4.00

Taintor Positive

\$9 doz. \$4.75

Shaving

Fox Shaving Sets, No. 30

doz. net, \$24.00

Smith & Hemenway Co.

50%

Sharpeners, Knife—

Chicago Wheel & Mfg. Co.

75%

Pike Mfg. Co.:

Fast Cut Pocket Knife Hones

\$1.50

Mounted Kitchen Sand Stone

\$1.50

Natural Grit Carving Knife

Hones, \$9 doz. \$3.00

Quick Cut Emery Carving

Knife Hones, \$9 doz. \$1.50

Quick Edge Pocket Knife

Hones, \$9 doz. \$1.50

Skate—

Smith & Hemenway Co.

30%

Shaves, Spoke—

Iron

doz. \$1.10@1.25

Wood

doz. \$1.75@2.25

Bailey's (Stanley R. & L. Co.)

45%

Razor Edge (Stanley R. & L. Co.)

35%

Chapin-Stephens Co.

30&30&10&10%

Goodell's

9 doz. \$9.00

Wood's P1 and P2

50%

Shears—

Cast Iron

7 8 9 in.

Best

\$16.00 18.00 20.00 gro.

Good

\$13.00 15.00 17.00 gro.

Cheap

\$5.00 6.00 7.00 gro.

Straight Trimmers, &c.—

Best quality Jap.

70@70&10%

Best quality, Nickel

60@60&10%

Fair quality, Jap.

80@80&5%

Fair quality, Nickel

75@75&10%

Tailors' Shears—

Acme

40@40&10%

Acme

40@40&5%

Heinisch's Tailors' Shears

50%

Wilkinson's Sheep, 1900 list

30&10&5%

Grass, 50&10%: Horse or Mule, 50&10%

Tinners' Snips—

Steel Blades

20&5@20&10%

Steel Laid Blades

40&10@50%

Forged Handles, Steel Blades, Berlin

50@50&5%

In lots less than one keg add
 1/2 per lb.; 5-lb. boxes add 1/4
 to list.

Cast Washers—
 Over 1/2 inch, barrel lots.....
 per lb. 1 1/4 @ 1/2

Weather Strip—
Flexible Felt—
 Lined, per 100 ft., \$2; \$3; \$4.....40@10%
 Moore's Unlined, per 100 ft., \$2; \$3;
 \$4.....50@15%

Wedges—
 Oil Finish.....lb. 2.70 @ 2.80

Weights—Hitching—
 Covert Mfg. Co.....40%

Sash—
 Per ton, f.o.b. factory:
 Eastern District.....\$27.50 @ \$28.00
 Southern Territory.....\$20.00 @ \$23.00
 Western and Central
 Districts.....\$23.00 @ \$25.00

Wheels, Well—
 8-in., \$1.55; 10-in., \$2.00; 12-in.,
 \$2.50; 14-in., \$3.00.

Wire and Wire Goods—
Bright and Annealed:
 6 to 9.....80%
 10 to 18.....80@2 1/2
 19 to 26.....80@7 1/2
 27 to 36.....80@2 1/2
 Galvanized:
 6 to 9.....75@5%
 10 to 14.....75@7 1/2
 15 to 18.....75@10@2 1/2
 19 to 26.....75
 27 to 36.....75@2 1/2
Coppered:
 6 to 9.....75@5%
 10 to 14.....75@7 1/2
 15 to 18.....75@10@2 1/2
 19 to 26.....75@5@5%
 27 to 36.....75
Tinned:
 6 to 14.....75@10@2 1/2
 15 to 18.....75@7 1/2
 Annealed, Steel and Tinned, on
 Spools.....70@10@10@10@10@10
 Brass and Copper on Spools.....
 60@5@10@5%
 Brass.....45
 Copper.....25
 Cast Steel Wire.....50%
 Wire Clothes Line see Lines.
 Wire Picture Cord, see Cord.

Bright Wire Goods—
 List June 24 '03.....90@20@90@25%
 Brass Cup Hooks and Brass
 Screw Hooks.....55@—%
Wire Cloth and Netting—
 Galvanized Wire Netting.....
 80@5@80@10%
 Painted Screen Cloth, 100 ft.,
 \$1.00 @ 1.10

Standard Galv. Hardware Grade:
 Nos. 2, 2 1/2 & 3 Mesh, sq. ft. 8
 Nos. 4 and 5 Mesh, sq. ft. 3 1/2
 No. 6 Mesh, sq. ft. 3 1/2
 No. 8 Mesh, sq. ft. 4

Wire, Barb—See Trade Report

Wrenches—
 Agricultural.....80@90@5%
 Alligator or Crocodile.....70@10@75%
 Baster Pattern 8 Wrenches.....
 70@5@70@10%
 Drop Forged 8.....45@5@5%
 Acme.....40@10%
 Alligator Pattern, 70%; Bull Dog, 70%
 Bemis & Call's.....
 Adjustable 8, 40%; Adjustable 8 Pipe,
 40%; Briggs Pattern, 40%; Combination
 Pattern Bright, 40%.
 Bemis Pipe.....60
 Combination Black.....40@5%
 Merrick Pattern.....50
 Borden's.....40%
 Coes' Genuine Knl. Hd. 40@10@5%
 Coes' Genuine Steel Hd. 40@10@5%
 Coes' Genuine Key Model, 40@10@5%
 Coes', Genuine Hammer Handle.....
 40@10@5%
 Coes' "Mechanics".....40@10@10@5%
 DeLough's Engineer.....40@10%
 Eagle & Call's.....50@10%
 Elgin Wrenches, 9 doz.....25
 Elgin Rethreading Attachment, one
 die, 9 doz.....25
 Elgin Extra Dies, 9 doz.....13
 Elgin Extra Jaws, 9 doz.....17
 Elgin Monkey Wrench Pipe Jaws,
 9 doz.....21
 Genl. Pocket.....30
 Hercules.....70%
 W & B. Machinist:
 Case lots.....50@5%
 Less than case lots.....50%
 W. & B. Railroad Special:
 Case lots.....50%
 Less than case lots.....40@10@5%
 Solid Handles, P. S. & W.....50@5%
 Stillson.....65
 Vulcan Chain.....50%

Fruit Jar—
 Triumph Fruit Jar Wrench, 5 grow
 lots, 9 gross, \$7.50; 9 doz.....\$0.80

Wringers—
 Tattle Roller Press Mop Pail Wringer,
 each, \$8.00; 9 doz.....\$18.00

Wrought Goods—
 Staples, Hooks, &c., list March
 '77, '92.....90@90@10%
Yokes, Ox, and Ox Bows—
 Fort, Madison's Farmers' & Freight-
 ers.....list net

Zinc—
 Sheet.....per 100 lbs. \$1.15@2.25

